

Unit (1) – Lesson (1)

“Attempts of Elements Classification”

1. Mendeleev's periodic table:

He arranged (67) elements in an ascending order according to their atomic weights.

Advantages of Mendeleev's periodic table:

- 1- He left gaps for discovery of new elements.
- 2- He corrected wrong atomic weights of some elements.

Disadvantages of Mendeleev's periodic table:

- 1- He made a disturbance in ascending order of atomic weights of some elements to put them in groups that suit their properties.
- 2- He had to deal with the isotopes of one element are different elements due to the difference in their atomic weights So he had to put more than one element in one place.

Rutherford: discover the positively charged protons inside the nucleus.

2. Moseley's periodic table:

- 1- He arranged elements in an ascending order according to their atomic numbers.
- 2- He added (0) group which includes inert (noble) gases.
- 3- He specified a place below the table for lanthanides and actinides elements.

Bohr: discovered the main energy levels of the atom (7 in the heaviest atom).

3. Modern periodic table:

- Scientists discovered that each main level contains other levels (energy sublevels).
- Elements are classified in the Modern periodic table according to:
 - 1- Their atomic number.
 - 2- The way of filling the energy sublevels with electrons.

The modern periodic table:

- It consists of (7) horizontal periods – (18) vertical groups.
- The number of known elements till now is (118), 92 of them are abundant, while the rest prepared artificially.
- The elements are classified into 4 blocks (s, p, d, f).

Notes:

1- The number of energy levels indicates the period number.

2- The number of electrons in outermost energy level indicates the group number.

- **Elements of the same group are:**

- Similar in chemical properties, because they have the same number of electrons in outermost energy.

- Different in the number of energy levels.

- **Elements of the same period are:**

- Different in chemical properties, because they don't have same number of electrons in outermost energy level.

- Similar in the number of energy levels.

1

H

2

He

3

Li

4

Be

11

Na

12

Mg

19

K

20

Ca

21

Sc

22

Ti

23

V

24

Cr

25

Mn

26

Fe

27

Co

28

Ni

29

Cu

30

Zn

31

Ga

32

Ge

33

As

34

Se

35

Br

36

Kr

37

Rb

38

Sr

39

Y

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Zr

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Nb

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Mo

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Tc

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Ru

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Rh

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Pd

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Ag

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Cd

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In

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Sn

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Sb

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Te

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I

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Xe

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Cs

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Ba

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Hf

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Re

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Os

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Ir

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Pt

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Au

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Hg

81

Tl

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Pb

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Bi

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Po

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At

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Rn

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Fr

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Ra

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Sg

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Uuh

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Uus

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Uuo

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La

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Ce

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Pr

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Nd

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Pm

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Sm

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Eu

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Gd

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Tb

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Dy

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Ho

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Er

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Tm

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Yb

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Lu

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Ac

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Th

91

Pa

92

U

93

Np

94

Pu

95

Am

96

Cm

97

Bk

98

Cf

99

Es

100

Fm

101

Md

102

No

103

Lr

1

H

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Li

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Be

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Na

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Np

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Pu

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Am

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Cm

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Bk

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Cf

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Es

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Fm

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Md

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No

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Lr

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H

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He

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Li

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Be

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Na

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Mg

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Ca

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Sc

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No

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Lr

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• **Choose the correct answer:**

1- The number of known elements till now is

- a- 216
- b- 118
- c- 316
- d- 16

2- The scientist had discovered the main energy level.

- a- Moseley
- b- Bohr
- c- Hofmann
- d- Rutherford

3- The scientist who discovered the positive proton in the nucleus is.....

- a- Moseley
- b- Bohr
- c- Mendeleev
- d- Rutherford

4- The scientist who left gaps in his table is

- a- Moseley
- b- Bohr
- c- Mendeleev
- d- Rutherford



Electronegativity
Power to Attract Electrons

5- Elements in the P-block are called.....

- a- transition elements.
- b- Lanthanides.
- c- actinides.
- d- noble gases

6- The element which occupy the middle block (d) in the periodic table are calledelements.

- a- transition
- b- alkali
- c- noble gases
- d- halogens

7- The inert gas which has the same electronic structure of sodium ion (Na^+) is.....

- a- **10Ne**
- b- **2H**
- c- **18Ar**
- d- **17Cl**

8- The transition elements starts to appear from the beginning of the..... period.

- a- second
- b- third
- c- fourth
- d- fifth

9- The element which located in period (3) and group (3A) is.....

- a- **13Al**
- b- **5B**
- c- **11 Na**
- d- **15 P**

10- The element that lies in the same period with ^{12}Mg is

- a - ^7N
- b- ^{15}P
- c- ^{20}Ca
- d- ^3L

11- Lanthanides and actinides are located in block.

- a- s
- b- p
- c- d
- d- f

12- An element ^{18}X is located in..... block.

- a- s
- b- p
- c- d
- d- f

13- The atomic number of an element that lies in period (4) and group (2A) is.....

- a- 4
- b- 18
- c- 20
- d- 10

• **Complete the following:**

1- Mendeleev arranged the element in an ascending order according to..... , while Mosley arranged them in an ascending order according to

2- Mosley located Andelements below his table.

- 3-block is located in the middle of the modern periodic table.
- 4- Element of s-block are located on the of the periodic table.
- 5- The modern periodic table consist of horizontal periods andvertical groups.
- 6- The scientist discovered the main energy levels.
- 7- An element (**Z**), its atomic number is 20 , so it locates in group and period

• **Write the scientific term:**

- 1- Elements of group zero in the modern periodic table. (.....)
- 2- They are indicted by the letter K, L, M, N,O (.....)
- 3- The number of electrons rotate in energy levels around the nucleus. (.....)
- 4- The block which contain group (1A) and (2A) in the periodic table. (.....)
- 5- Elements which occupy the middle block (d) in the periodic table. (.....)
- 6- It is the number of protons inside the nucleus. (.....)
- 7- A scientist that arranged the elements in an ascending order according to their atomic number. (.....)

• **Correct the underlined words:**

- 1- Mendeleeey discovered that the nucleus of the atom is positively charged.
- 2- Rutherford discovered the main energy levels.
- 3- Moseley put lanthanides and actinides on the left side of the periodic table.
- 4- Moseley arranged the elements ascending according to their atomic weight.

• **Locate the position of an element that its atomic no. is 17 , then:**

- find the atomic number of the element above it in the same group.

.....

-write the name of the group in which both of them are present.

.....

• **Write down the electronic configuration of the following elements then mention their group number and period number.**

• ${}^9\text{F}$ ${}^{19}\text{K}$ ${}^{10}\text{Ne}$ ${}^{15}\text{P}$ ${}^{17}\text{Cl}$ ${}^{20}\text{Ca}$ ${}^2\text{He}$

	<u>electronic configuration</u>	<u>their group no</u>	<u>their period no</u>
${}^9\text{F}$			
${}^{19}\text{K}$			
${}^{10}\text{Ne}$			
${}^{15}\text{P}$			
${}^{17}\text{Cl}$			
${}^{20}\text{Ca}$			
${}^2\text{He}$			

Lesson (2)

“Graduation of the properties of elements in the Modern periodic table”

- The properties of elements in the Modern periodic table:

- Atomic size. - Electronegativity. - Metallic and none-metallic properties.

- **Atomic size:** The atomic radius is used to measure Atomic size and its measuring unit is picometre
- **Electronegativity:** It's the ability of the atom in covalent molecule to attract the electrons of the chemical bond towards itself.
- **Metals:** They are the elements which have less than four electrons in their outermost energy levels.
- **Positive ion:** Is an atom of metallic element losing an electron or more during the chemical reaction.
- **Nonmetals:** They are elements which have more than 4 electrons in their outermost energy levels.
- **Negative ion:** Is an atom of nonmetallic element gaining an electron or more during chemical reaction.
- **Metalloids:** They are elements which have the properties of both metals and nonmetals.

Notes:

- 1- The atomic size of an element decreases in periods.
 - Due to the increase of the attraction force between the positive nucleus and outermost electrons.
- 2- The atomic size of an element Increases in groups.
 - Due to the increase of the number of energy levels and decrease of attraction force.
- 3- Metals tend to lose the outermost electrons and changes into positive ion.
- 4- The electronic configuration of (Na⁺), (Mg⁺²) and (Al⁺³) is similar to the nearest inert gas (Ne¹⁰).
- 5- **Basic oxides:** They are metallic oxides, some of them dissolve in water giving alkaline solutions. Their solutions (alkalis) turn litmus solution into blue.

6- Acidic oxides: They are nonmetal oxides, some of them dissolve in water giving acids. Their solutions (acids) turn litmus solution into red.

7- The chemical properties of metals :

1-Some metals react with dilute acids forming salt of acid and hydrogen gas



Magnesium + Hydrochloric acid \longrightarrow Magnesium chloride+ Hydrogen

2-Metals react with oxygen forming metallic oxides which are known as basic oxides.



Magnesium + Oxygen \longrightarrow Magnesium oxide

3- Basic oxides which dissolve in water form alkalis:



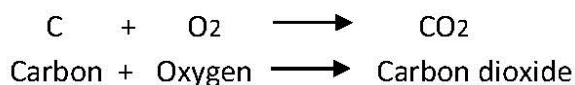
Magnesium oxide + Water \longrightarrow Magnesium hydroxide

- ❖ (K) Potassium and (Na) Sodium React instantly with water and H_2 evolves.
- ❖ (Ca) Calcium and (Mg) Magnesium React very slowly with cold water.
- ❖ (Zn) Zinc and (Fe) Iron React in high temperature with only hot water vapour.
- ❖ (Cu) Copper and (Ag) Silver Don't react with water.

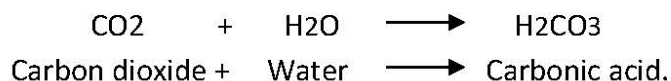
8- The chemical properties of nonmetals :

1- Nonmetals don't react with the acids.

2 Nonmetals react with oxygen forming non-metal oxides. Most of them are known as acidic oxides.



3-The nonmetal oxide dissolves in water forming acids.



• **Choose the correct answer:**

1- Each period in the periodic table starts with a/anElement.

- a- Semi-metallic
- b- inert gas
- c- non metallic
- d- metallic.

2- When sodium reacts with water ,gas evolves.

- a- CO_2
- b- H_2
- c- O_2
- d- N_2

3- Burning of carbon in the air produce.....

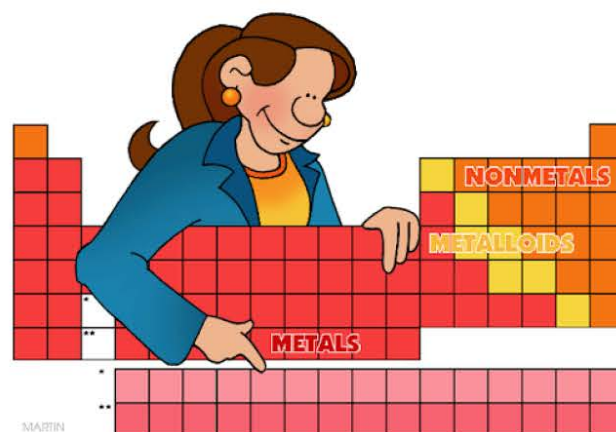
- a- CO
- b- CO_2
- c- CaO
- d- C

4- Which of the following is a metalloid?.....

- a- sodium
- b- iron
- c- silicon
- d- fluorine

5- The strongest metal lies in group

- a- (0) group
- b- (1A)
- c- (1B)
- d- (7A)



6- Metal oxides are oxides.

- a. basic
- b. acidic
- c. neutral.
- d. normal

• **Put (✓) or (x) :**

- 1- The metallic property in group (1A) increases as we go from up to down. (.....)
- 2- Metallic property of the same group increases by the increase of the atomic number. (.....)
- 3- The atomic size increases in the same group by increasing the atomic number. (.....)
- 4- Solutions of nonmetal oxides turn the violet litmus solution into red. (.....)
- 3- Water and ammonia are from polar compound. (.....)

• **Complete the following:**

- 1- During the chemical reaction, metal atom tends to electrons and changes intoion.
- 2- In the group , by increasing the atomic number , the atomic size..... .
- 3- As the atomic number increases in the same period, the nonmetallic property.....
- 4- Each period in the modern periodic table starts with..... element and ends withelements.
- 5- The elements that have the properties of metals and nonmetal are called.....
- 6- Sodium oxide is from Oxides, while carbon oxide is from.....Oxides.
- 7- nonmetals Oxides dissolve in water giving which turn the litmus solution into

- 8- Metals are arranged in order according to their.....in the chemical activity series.
- 9- Sodium oxides is fromoxides.
- 10- $\text{MgO} + \text{H}_2\text{O} \longrightarrow$
- 11- Magnesium reacts with hydrochloric acid givingand.....
- 12- The measuring unit of atomic size of atom is.....

• **Write the scientific term:**

- 1- It is the measuring unit of the atomic size of element. (.....)
- 2- A kind of elements in which their valence electrons contain more than 4 electrons. (.....)
- 3- A kind of elements in which their outermost energy level contains less than 4 electrons. (.....)
- 4- Elements react with oxygen forming acidic oxides. (.....)
- 5- An atom of metallic element which loses one electron or more during the chemical reaction.(.....)
- 6- The substances which have some properties of metals and some properties of nonmetals(.....)
- 7- A group contains the strongest nonmetal. (.....)
- 8- The ability of the atom in the covalent molecule to attract the chemical bond electrons to it.
(.....)
- 9- Elements which have the properties of metals and nonmetals. (.....)
- 10- A series in which metals are arranged in a descending order according to their chemical activity
(.....)
- 11- Elements react with oxygen forming acidic oxides. (.....)
- 12- The oxides that turn litmus paper into red. (.....)

• **Give reason for:**

1- In periods by increasing the atomic number, the atomic size decrease.

.....

2- Sodium is kept under kerosene surface.

.....

3- Atomic size increase from up to down in the group.

.....

• **Write the balance chemical equations for the following :**

1- Reaction of magnesium with diluted hydrochloric acid.

.....

2- Reaction of carbon dioxide with water.

.....

3- Reaction of magnesium oxide with water.

.....

4- Burning magnesium in oxygen.

.....

5- Reaction of copper with hydrochloric acid.

.....

• **How can you differentiate between each of the following?**

- Coal and magnesium, (using HCl)

.....

.....

- Calcium oxide solution and sulphur trioxide solution.

-

-

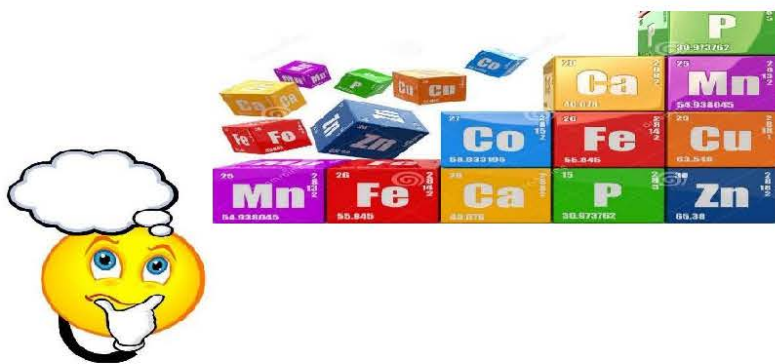
- Compare between

1. Basic oxides and acidic oxides:

basic oxides	acidic oxides

2. Metals and nonmetals:

Metals	nonmetals



Test

1

Total mark

10

(5 marks)

Question 1

A Choose the correct answer from a, b, c or d :

- 1 The modern periodic table consists of horizontal periods.
 (a) 7 (b) 10 (c) 14 (d) 18
- 2 The electronic configuration of magnesium ion (Mg^{+2}) is similar to all the following except
 (a) Na^+ (b) $_{10}Ne$ (c) Al^{+3} (d) $_{18}Ar$
- 3 The chemical properties of calcium ($_{20}Ca$) are similar to those of
 (a) $_{19}K$ (b) $_{12}Mg$ (c) $_{25}Mn$ (d) $_{3}Li$
- 4 Sodium oxide is from oxides.
 (a) acidic (b) basic (c) amphoteric (d) nonmetal

B Write the balanced chemical equation, which express the following reaction :

Magnesium with dilute hydrochloric acid.

.....

Question 2

(5 marks)

A Write the scientific term of each of the following :

- 1 Covalent compounds, in which the difference in electronegativity between their elements is relatively high. (.....)
- 2 The block that contains the groups from (3A) to (0). (.....)
- 3 An atom of a nonmetallic element, which gains one electron or more during the chemical reaction. (.....)
- 4 It indicates the number of energy levels, which are occupied by electrons in the atom of an element. (.....)

B Locate the following elements in the modern periodic table :

- 1 Argon ($_{18}Ar$).
- 2 Calcium ($_{20}Ca$).

.....

Test

2

Total mark

10

(5 marks)

Question 1

A Put (✓) or (X) and correct the wrong ones :

- 1 Some alkalis dissolve in water forming bases. ()
- 2 The elements with similar properties have been put in horizontal periods. ()
- 3 Metalloids have the properties of metals and nonmetals. ()
- 4 An element that is located in period (3) and group (2A), its atomic number is 13. ()

B Explain the behaviour of the following elements with water :

- 1 Iron
- 2 Potassium.

.....

.....

.....

.....

Question 2

(5 marks)

A Write the scientific term of each of the following :

- 1 The nonmetal oxides which dissolve in water forming acidic solutions. (.....)
- 2 Elements of zero group in the modern periodic table. (.....)
- 3 A group contains the strongest metals. (.....)
- 4 The polar compound, which consists of one oxygen atom and two hydrogen atoms. (.....)

B What happens when ... ?

Passing carbon dioxide gas in water.

.....

.....

Answers of Test

1

Question

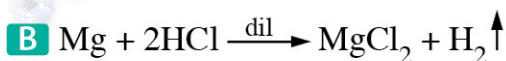
1

A 1 (a)

2 (d)

3 (b)

4 (b)



Question

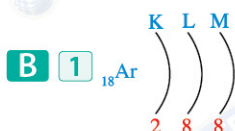
2

A 1 Polar compounds.

2 P-block.

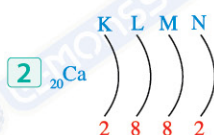
3 Negative ion.

4 Period number.



Period (3)

Group (0) or (18)



Period (4)

Group (2A)

Answers of Test

2

Question

1

A 1 (X) Some bases forming alkalis.

2 (X) put in vertical groups.

3 (✓)

4 (X) is 12

B 1 Iron reacts at high temperatures with hot water vapour.

2 Potassium reacts instantly with water and hydrogen gas evolves which burns with a pop sound.

Question

2

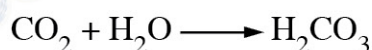
A 1 Acidic oxides.

2 Inert gases.

3 Group (1A).

4 Water.

B It dissolves forming carbonic acid solution





October Revision

Mr. Ahmed Elbasha

✱ (1) Write the scientific term :

- 1) The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
- 2) The halogen which exists in a liquid state.
- 3) It is a series in which metals are arranged in a descending order according to their chemical activity.
- 4) Metals are arranged in descending according to their chemical activity.
- 5) The apparatus which is used in water electrolysis.
- 6) A bond that exists between water molecules.
- 7) The horizontal rows in the modern periodic table.
- 8) The gas which is collected at the cathode in water electrolysis.
- 9) A liquid metal acts as a heat conductor in nuclear reactors for generating electricity.
- 10) The kind of bond which binds oxygen atom with hydrogen atom in water molecule.
- 11) The strongest metal in group (1A)
- 12) The elements that occupy the middle block (d) in the periodic table.

- 13) Elements where their valency shell contains more than four electrons.
-
- 14) A molecule produced from the union of an oxygen atom and its molecule.
-
- 15) A bond that exists between water molecules.
-
- 16) The product of dissolving nonmetallic oxides in water.
-
- 17) Weak electrostatic attraction that arises between the molecules of the polar compounds.
-
- 18) The measuring unit of the atomic size of an element.
-
- 19) The number of protons inside the nucleus of the atom of an element.
-
- 20) The halogen which exists in a solid state.
-
- 21) The scientist who discovered that the atom contains positive protons in the nucleus.
-
- 22) Elements which have properties of metals and nonmetals.
-
- 23) Adding any substance to the water which changes its properties, affects the health and life of living organisms.
-
- 24) The apparatus which is used for water electrolysis.
-

***(2) Choose the right answer:**

1.The properties of the element which has atomic number equals 17 are similar to the element which has atomic number equals

- a. 7 b.9 c. 15 d. 20

2..... is the lowest metallic element is group (1A).

- a. Na b. Cs c. K d. Li

3.The oxide which dissolves in water and produces an acid is

- a. MgO b. FeO c. CuO d. CO₂

4.The gas which is evolved on reacting alkali metals with water is

- a. oxygen. b. nitrogen. c. hydrogen. d. helium.

5.The volume of hydrogen gas evolving from water electrolysis is the volume of oxygen gas .

- a. equal to b. twice c. half d. four times

6.Elements of group (7 A) are known as

- a. inert gases. b. alkali metals.
c. halogens. d. alkaline Earth metals.

7.Elements of the same period in the modern periodic table have the same

- a. number of energy levels. b. atomic number.
c. number of electrons in the outermost energy level. d. valency.

8.Metal oxides are oxides.

- a. acidic b. basic c. both of them d. no correct answer

9.There are bonds between water molecules.

- a. ionic b. covalent c. hydrogen d. metallic

10..... react very instantly with water and hydrogen gas evolves.

- a. K and Na b. Cu and Ag c. Zn and Fe d. Ca and Mg

11..... is a polar compound.

- a. Petrol b. Water c. Alcohol

12.The main energy levels discovered by Bohr in the atom are

- a.7 b. 5 c. 3

13.The elements of group (7A) are known as

- a. alkali metals. b. halogens. c. alkaline earth metals.

14.The scientist had discovered the main energy levels.

- a. Moseley b. Bohr c. Hofmann d. Mendeleev

15.The atomic number of an element that exists in group (7 A) and period (2) is

- a. 12 b. 7 c. 9 d. 17

16.Each period in the periodic table starts with a/an

- a. metal. b. metalloid. c. nonmetal. d. inert gas.

17..... is considered from halogens.

- a. Sodium b. Chlorine c. Helium d. Calcium

18.The density of ice is the density of water.

- a. less than b. more than c. equal to

19.All of the following metals react with water except

- a. K b. Cu c. Na d. Mg

20.Eating fish, which contain high concentration of causes the death of brain cells.

- a. mercury b. arsenic c. lead d. iron

21.Which of the following elements is located in the third period ?

- a. ${}_{19}\text{K}$ b. ${}_6\text{C}$ c. ${}_3\text{Li}$ d. ${}_{15}\text{P}$

22.The atomic radius is measured in

- a. nanometre. b. picometre. c. kilometre.

23.Ice crystals have shape.

- a. tetragonal b. pentagonal c. hexagonal

24.The element, whose atomic number is (15) is similar in its chemical properties as the element whose atomic number is

- a. 5 b. 7 c. 17 d. 19

25.The number of elements in the Earth's crust equals

- a. 118 b. 92 c. 120

26.The transition elements start to appear from the beginning of the period.

- a. second b. third c. fourth d. fifth

27.p-block contains groups.

- a. 10 b. 2 c. 6 d. 8

28.The inert gas that has the same electronic structure as (Na^+) is

- a. ${}_{10}\text{Ne}$ b. ${}_2\text{He}$ c. ${}_{18}\text{Ar}$ d. ${}_{17}\text{Cl}$

29.The modern periodic table contains elements.

- a. 26 b. 92 c. 100 d. 118

30. Which of the following is an acidic oxide ?

- a. CO_2 b. MgO c. Na_2O d. FeO

31. Which of the following is a radioactive element which is used in food preservation ?

- a. Liquid sodium. b. Liquefied nitrogen.
c. Cobalt 60. d. Water.

32. Water has high boiling point due to the presence of bonds between its molecules.

- a. hydrogen b. ionic c. covalent d. metallic

33. added group zero in his table for noble gases.

- a. Mendeleev b. Moseley c. Rutherford d. Einstein

34. Which of the following is the halogen that exists in a solid state ?

- a. Fluorine. b. Chlorine. c. Bromine. d. Iodine.

35. When putting a glass bottle completely filled with water in the freezer, it breaks because when water freezes its increases.

- a. temperature b. density c. volume d. acidity

36. Which of the following elements don't react with water ?

- a. K and Na b. Ca and Mg c. Zn and Fe d. Cu and Ag

37. What is the volume of hydrogen gas evolved from electrolysis of acidified water if you know that the volume of oxygen gas evolved is 2 cm^3 ?

- a. 1 cm^3 . b. 2 cm^3 . c. 4 cm^3 . d. 6 cm^3

38. The transitional elements start to appear from period

- a. 2 b. 3 c. 4 d. 5

39. When sodium reacts with water gas evolves.

- a. N_2 b. O_2 c. H_2

40. is considered from halogens.

- a. Sodium b. Chlorine c. Helium

41. Sodium oxide from oxides.

- a. amphoteric b. acidic c. basic

42. Each period in the modern periodic table starts with (a/an) element.

- a. metallic b. inert c. nonmetallic

43. The elements of group (1A) are known as

- a. alkali metals. b. halogens. c. alkaline Earth metals.

44. The largest atom of elements in size is atom.

- a. cesium (Cs) b. fluorine (F) c. bromine (Br)

✱(3) Complete the following :

1. Transition elements appear from period numberin the modern periodic table.
2. is an example of polar compounds.
3. Increasing of mercury concentration in drinking water causes
4. Fluorine and chlorine exist in state.
5. Eating fish which contains high concentration of lead causes
but drinking water which contains high concentration of mercury leads to
6. Basic oxides are oxides and their solutions turn the litmus solution into
7. Alkali metals are good conductors of and
8. $\text{CO}_2 + \text{H}_2\text{O} \rightarrow$
9. $\text{Br}_2 + 2\text{KI} \rightarrow$ +
10. Moseley arranged elements ascendingly according to, while Mendeleev arranged elements ascendingly according to The crystal of ice has shape.
11. The scientist discovered the main energy levels in the atom.
12. There are bonds between water molecules.
13. and are examples of polar compounds.
14. The valency of alkali metal elements is
15. Pure water boils at and freezes at
16. The strongest metallic element is found in group
17. Elements in group (1A) are called alkali metals as their elements react with
forming solutions.
18. There are bonds between water molecules.
19. Elements that locate in the middle of the periodic table are called

20. Elements of group (1A) are called , but elements of group (7A) are called
21. The transition elements start to appear from the beginning of the period and symbolized by letter
22. The bond between hydrogen atom and oxygen atom in water molecule is bond, while bonds among water molecules are bonds.
23. Sodium is kept under the surface of so , as not to react with
24. and are metals which don't react with water.
25. Elements of s-block are located on the side of the periodic table and they are arranged in groups.
26. is used in food preservation.
27. Moseley put and series below the periodic table.
28. "d" block elements are called the elements.
29. Cobalt 60 has the ability to kill
30. The strongest nonmetal lies in group
31. When the atomic number increases in the same period, the metallic property
32. $\text{MgO} + \text{H}_2\text{O} \rightarrow \dots\dots\dots$
33. is from the examples of polar compounds because the difference in electronegativity between its elements is relatively
34. Mendeleev arranged the elements ascendingly according to , while Moseley arranged them ascendingly according to
35. During the electrolysis of acidified water by Hofmann's voltammeter, the gas evolves at the anode, while the gas evolves at the cathode.
36. The number of groups in p-block is in modern periodic table.
37. Sodium reacts with water to produce gas.

38. Elements of group (1A) are called
39. Both sodium ($_{11}\text{Na}$) and potassium ($_{19}\text{K}$) are located in the same because they have the same number of
40. There are bonds between molecules of water
41. Number of elements in Mendeleev's periodic table
42. Number of elements in the modern periodic table
43. Maximum number of energy levels
44. The angle between water molecules

✱(4) **Correct the underlined words:**

1	Ice crystals have <u>round</u> shape	(.....)
2	Elements of <u>p-block</u> are organized in two groups.	(.....)
3	Sodium oxide is from <u>acidic</u> oxides.	(.....)
4	<u>Fluorine</u> is the only liquid halogen.	(.....)
5	<u>Sodium chloride</u> is from polar compounds	(.....)
6	<u>Chlorine</u> element has the smallest atomic size.	(.....)
7	<u>Rutherford</u> discovered the main energy levels.	(.....)
8	<u>Oil</u> is a covalent compound dissolves in water.	(.....)
9	Each period in the periodic table starts with <u>inert gas</u> .	(.....)
10	An element which is located in the 3rd period and group (2A) , its atomic number is <u>8</u>	(.....)
11	Mixing animals and human wastes with water causes <u>chemical</u> pollution.	(.....)
12	Eating food containing high percentage of lead causes <u>blindness</u> .	(.....)
13	The elements with the same physical and chemical properties have been put in <u>horizontal periods</u> .	(.....)
14	Transition elements start from the <u>second</u> period.	(.....)
15	<u>Inert gases</u> have the properties of metals and nonmetals.	(.....)
16	<u>Hydrogen</u> used in preserving eye cornea.	(.....)

17	Pure water has <u>acidic</u> effect on litmus paper.	(.....)
18	<u>Sodium</u> is used in making electronic slides.	(.....)
19	Cobalt 60 is used in preservation of <u>cornea of eye.</u>	(.....)
20	When the temperature of water decreases to less than <u>0°C</u> , its density decreases and, so it floats on water surface in the form of ice crystals.	(.....)
21	Mendeleev arranged the elements according to their <u>atomic number.</u>	(.....)
22	Alkali metals are <u>bad</u> conductors of heat and electricity.	(.....)
23	<u>Sodium</u> is considered as the most active metal in the periodic table.	(.....)
24	Elements of group 1A are known as <u>halogens.</u>	(.....)
25	<u>Covalent</u> bond is a weak electrostatic attraction force which arises among water molecules.	(.....)
26	If the metal lost one electron or more, it will become a <u>negative</u> ion.	(.....)

★(5) Give reason for:

1. Water molecule is from polar compounds.

.....

2. Dissolving of sugar in water although it is among covalent compounds.

.....

3. Water has high boiling point.

.....

4. Bromine cannot replace chlorine in sodium chloride.

.....

5. The atomic size increases in the same group by increasing the atomic number.

.....

6. Reaction of potassium with water is stronger than that of sodium with water.

.....

7. Silicon slides are used in making electronics as computers .

.....

8. Magnesium oxide is a basic oxide.

.....

9. Cesium is the most active metal in group (1A).

.....

10.Sugar dissolves in water.

.....

11.Although sugar is a covalent compound, it dissolves in water.

.....

12.Liquefied nitrogen is used in preservation of the eye cornea.

.....

13.Cobalt 60 is used in food preservation.

.....

14.Elements of the same group have similar properties.

.....

15.Sodium is kept under the surface of kerosene.

.....

16.The atomic size decreases in periods by increasing the atomic number.

.....

17.Water density decreases on freezing.

.....

18.Chlorine replaces bromine in potassium bromide solution.

.....

19.Adding drops of dilute acid to water during its electrolysis.

.....

20.Potassium reacts with water instantly and faster than sodium.

.....

✱(6) **What happen if:**

1. Storing drinking water in plastic bottles.

.....

2. Eating fish contains high concentration of lead.

.....

3. Putting a magnesium strip in a test tube containing oxygen.

.....

4. Dissolving magnesium oxide in water.

.....

5. passage of electricity in Hofmann's voltammeter containing acidic water.

.....

6. The pollution of water with animals and human wastes.

.....

7. Decreasing water temperature to less than 4°C.

.....

*** (7) Put (\checkmark) or (X) :**

- | | |
|---|-----|
| 1. Nonmetal oxides dissolve in water forming acidic solutions. | () |
| 2. Silicon slides are good conductors of electricity. | () |
| 3. Alkali metals locate in group (2A) . | () |
| 4. Ice crystals have pentagonal shapes. | () |
| 5. In the period as the atomic number increases, the atomic size increases. | () |
| 6. Halogens are monovalent elements. | () |
| 7. The atomic size increases in the group by increasing the atomic number. | () |
| 8. Water and ammonia are non-polar compounds. | () |
| 9. Liquefied sodium is used in preservation of cornea of the eye. | () |
| 10. The atomic size decreases in periods as the atomic number increases. | () |
| 11. Halogens are from monovalent metals. | () |
| 12. Bohr had discovered the main energy levels. | () |
| 13. Each period starts with a weak metal. | () |
| 14. Water and ammonia are from polar compounds. | () |
| 15. Mendeleev arranged the elements ascendingly according to their atomic number. | () |
| 16. Water and ammonia are non-polar compounds. | () |
| 17. Liquefied sodium is used in the preservation of the eye cornea. | () |
| 18. Water molecules are linked together by ionic bond. | () |
| 19. Copper metal doesn't react with water. | () |
| 20. Hydrogen evolves at positive pole in Hofmann's voltameter. | () |
| 21. Density of ice is more than that of water. | () |
| 22. Ice crystals have pentagonal shapes . | () |

*** (9) Write the balanced chemical equations which express the following reactions :**

1. Magnesium with dil. hydrochloric acid.
.....
2. Bromine with potassium iodide.
.....
3. Decomposition of acidified water by electricity into two elements hydrogen and oxygen.
.....
4. Reaction of sodium with water.
.....
5. Reaction of carbon dioxide gas with water.
.....
6. Reaction of chlorine gas with potassium bromide solution.
.....
7. Potassium iodide with bromine.
.....

✱(11) Problems

1

Choose from column (B) what suits it in column (A) :

(A) Harms	(B) Pollutant
1. Death of brain cells. 2. Liver cancer. 3. Blindness.	a. lead. b. sodium. c. mercury. d. arsenic.

1-

2-

3-

2

From the following diagram which represents a part of the periodic table, answer the following questions :

[illegible]

[NB. The letters in the table don't represent the actual symbols of the elements]

1. Arrange the elements B, A, R, L descendingly according to the atomic size.
2. Complete the following :

The shaded part represents elements.

3. Write the letter(s) of the element(s) which :
- (a) Belong(s) to d-block. (b) is/are from inert gases.
- (c) Belong(s) to alkali metals.

3

Study the following figure which represents a section of the periodic table, then answer :

														N		
A												I	K		L	
	C											H				O
B				D			E		F		G		J			M

[NB. The letters in the table don't represent the actual symbols of the elements]

Write the symbol(s) which indicate(s) :

- a. Halogens.
c. The most active metal.
- b. Inert gases.
d. Transition elements.

4

Calculate the atomic number of :

1. Element (X) is located in the 3rd period and group (2A).
2. Element (Y) is located in the 1st period and group (1A).

5

Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Liquid sodium	a. is used in preservation of food.
2. Liquefied nitrogen	b. is used in manufacture of electronic devices.
3. Cobalt 60	c. is used in nuclear reactors.
4. Silicon slides	d. is used in preservation of cornea of the eye.

1-

2-

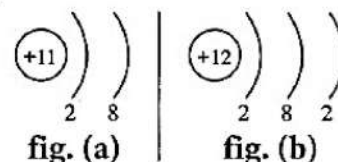
3-

4-

6

Study the opposite figures and answer the following questions :

1. Which figure represents a positive ion ?
2. Which figure represents a neutral atom ?
3. Determine the position of the atom in the periodic table.



Model Answer

✱ (1) Write the scientific term:

1. Electronegativity	7. Period	13. Nonmetals	19. Atomic number
2. Bromine	8. Hydrogen	14. Ozone	20. Iodine
3. Chemical activity series	9. Sodium	15. Hydrogen bond	21. Rutherford
4. Chemical activity series	10. Single covalent bond	16. Acidic oxide	22. Metalloid
5. Hofmann voltmeter	11. Cesium	17. Hydrogen bond	23. Water pollution
6. Hydrogen bond	12. Transition element	18. Picometer	24. Hofmann voltmeter

✱ (2) Choose the right answer:

1. B	9. C	16. A	23. C	31. C	39. C
2. D	10. A	17. B	24. B	32. A	40. B
3. D	11. B	18. A	25. B	33. B	41. C
4. C	12. A	19. B	26. C	34. D	42. A
5. B	13. B	20. C	27. C	35. C	43. A
6. C	14. B	21. D	28. A	36. D	44. A
7. A	15. C	22. B	29. D	37. C	
8. B			30. A	38. C	

✱ (3) Complete the following :

1. Four	17. Water - alkaline	32. $\text{Mg}(\text{OH})_2$
2. Water	18. Hydrogen	33. Water – high
3. Blindness	19. Transition element	34. Atomic weight – atomic number
4. Gas	20. Alkali metals – halogen	35. Oxygen - Hydrogen
5. Death of brain cells – blindness	21. Four – d	36. 6
6. Base – blue	22. Single covalent bond – hydrogen	37. Hydrogen
7. Heat – electricity	23. Kerosene -Water	38. Alkali metals
8. H_2CO_3	24. Ag – Cu	39. Group – electrons in outermost energy level
9. $\text{KBr} + \text{I}_2$	25. Left – two	40. Hydrogen
10. Atomic number – atomic weight	26. Cobalt 60	41. 67
11. Bohr	27. Lanthanides – actinides	42. 118
12. Hydrogen	28. Transition	43. 7
13. Water – ammonia	29. Microbes	44. 104.5
14. Monovalent	30. 7A	
15. 100 – 0	31. Decrease	
16. 1A		

✱(4) Correct the underlined words:

- | | | |
|--------------|-------------------------|-------------------|
| 1. Hexagonal | 10. 12 | 19. Food |
| 2. S-block | 11. Biological | 20. 4 degrees |
| 3. Basic | 12. Death of brain cell | 21. Atomic weight |
| 4. Bromine | 13. Vertical group | 22. Good |
| 5. Water | 14. Fourth | 23. Cesium |
| 6. Fluorine | 15. Metalloid | 24. Alkali metals |
| 7. Bohr | 16. Liquefied nitrogen | 25. Hydrogen |
| 8. Sugar | 17. Neutral | 26. Positive |
| 9. Metal | 18. Silicon | |

✱(5) Give reason for:

- 1- Because of the electronegativity difference between its elements is relatively high
- 2- Because sugar forms a hydrogen bond with water.
- 3- Due to the presence of hydrogen bonds between water molecules
- 4- Because bromine is less active than chlorine
- 5- Because the attraction force between positive nucleus and the electrons in the outermost energy level increases, therefore atomic radius decreases, so atomic size decreases.
- 6- Because its atomic size is greater than that of sodium and more active than it
- 7- Because it is semi-conductor
- 8- Because it dissolves in water forming alkalis which turn the color of litmus solution into blue
- 9- Because the metallic property increases in groups by increasing the atomic number
- 10- Because sugar forms a hydrogen bond with water
- 11- Because sugar forms a hydrogen bond with water
- 12- Due to the decrease of its boiling point.
- 13- Because it radiates (produces) gamma rays which prevent the reproduction of microbes
- 14- Because they have the same number of electrons in the outermost energy level.
- 15- Because they are metals which reacts strongly with water

$$2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$$
- 16- Because the attraction force between positive nucleus and the electrons in the outermost energy level increases, therefore atomic radius decreases, so atomic size decreases
- 17- Because it's volume increase
- 18- Because it is more active than bromine
- 19- Because pure water is bad conductor of electricity
- 20- Because it is more active than sodium

✱(6) What happen if:

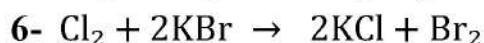
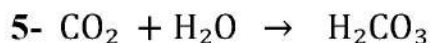
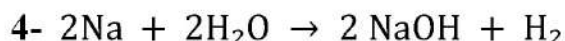
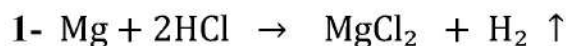
1. Plastic will react with chlorine gas leading to the increase in the infection rates by cancer
2. It causes the death of brain cells.
3. It burns with bright light and magnesium oxide is formed. $2\text{Mg} + \text{O}_2 \xrightarrow{\Delta} 2\text{MgO}$
4. It forms alkalis which turn the color of litmus solution into blue. $\text{MgO} + \text{H}_2\text{O} \rightarrow \text{Mg}(\text{OH})_2$
5. **1. Acidified water decomposes by electricity into:**
 Oxygen gas evolves at the anode (because oxygen ions are negative)
 Hydrogen gas evolves at the cathode (because hydrogen ions are positive)
2- The volume of hydrogen is twice the volume of oxygen.
 Because water molecule H_2O is composed of two hydrogen atoms and one oxygen atom

$$\text{H}_2\text{O} \xrightarrow{\text{electrolysis}} \text{O}_2 + \text{H}_2$$
6. It causes many diseases such as: Bilharzia, typhoid and hepatitis.
7. Water molecules are collected and form crystal of hexagonal shape

★(7) Put (√) or (X) :

1. (√)	5. (X)	9. (X)	13. (X)	17. (√)	21. (X)
2. (√)	6. (√)	10. (√)	14. (√)	18. (X)	22. (X)
3. (X)	7. (√)	11. (X)	15. (X)	19. (√)	
4. (X)	8. (X)	12. (√)	16. (X)	20. (X)	

★(9) Write the balanced chemical equations which express the following reactions :



★(11) Problems

1	1. a 2. d 3. c	4	<p>1. Atomic number of element (X) = 2 + 8 + 2 = 12</p> <p>2. Atomic number of element (Y) = 1</p>
2	1. $A > B > L > R$ 2. Metalloid 3. (a) N (b) H (c) E , A and C	5	1. c 2. d 3. a 4. b
3	a. L and M b. N and O c. B d. D , E , F and G	6	1. fig. (a). 2. fig. (b). 3. period (3) group (2A)

Revision Sheets For 2nd prep.

Unit 1 (Lesson 1 and 2)



Write the scientific term:

1. The table in which elements are arranged according to their atomic weights.
2. The table in which elements are arranged according to their atomic numbers.
3. The table in which elements are arranged according to the atomic number and the way of filling the energy sublevels with electrons.
4. • A group of elements found in the middle of the periodic table and includes ten vertical columns.
5. Elements of group zero in the modern periodic table.
6. • Elements of "f block in the modern periodic table.
7. • A part from a million of million part of metre.
• The measuring unit of atomic radius which is used as a measure for the atomic size.
8. The ability of the atom in covalent molecule to attract the electrons of the bond towards itself.
9. Covalent compounds in which the difference in electronegativity between their elements is relatively high.
10. The polar compound which consists of one oxygen atom and two hydrogen atoms.
11. • Elements which have less than four electrons in their outermost energy level.
12. An atom of metallic element which loses one electron or more during the chemical reaction.
13. • Elements which have more than four electrons in their outermost energy level.
14. An atom of non-metallic element which gains one electron or more during the chemical reaction.
15. The gas which is evolved on adding dilute hydrochloric acid to a piece of magnesium.
16. A solution used to differentiate between acids and bases.
17. Oxides which dissolve in water producing alkalis.
18. • Substances which turn the litmus solution into blue.
• Substances resulted from dissolving of metal oxides in water.
19. • A series in which metals are arranged in a descending order according to their chemical activity.
20. The gas which is produced on burning a piece of coal.

21. The acid which is produced on dissolving carbon dioxide in water.
22. • Substances resulted from dissolving of non-metal oxides in water.

Locate the position of the following elements in the modern periodic table:

1-(₂He).

2-(₁₇Cl).

3- (₁₈Ar).

4- (₂₀Ca).

Calculate the atomic numbers of the following elements :

1. An element is located in the 1st period and group (1 A).
.....
2. An element is located in the 2nd period and group zero.
.....
3. An element is located in the 3rd period and group (2A).
.....

Give reason:

- 1-Mendeelev left gaps in his periodic table.
.....
- 2-Elements of the same group have similar properties.
 - Both sodium (₁₁Na) and potassium (₁₉k) are located in the same group.
.....
- 4-Both Lithium (₃Li) and nitrogen (₇N) are located in the same period
.....
- 5- The atomic size increases in groups .
.....
- 6- The atomic size of (₁₁Na) is greater than that of (₃Li)
.....
- 7-Water molecule is from the polar molecules.
.....

8-Solution of magnesium oxide in water turns the violet litmus solution into blue.

.....

9-Solution of carbon dioxide in water turns the violet litmus solution into red.

.....

Complete:

1. The most important attempts to classify elements are,
..... and..... tables.
2. Mendeleev discovered that the properties of elements were repeated
..... by the beginning of each.....
3. One of the advantages of Mendeleev's table is correcting the wrongly
estimated..... of some elements.
4. Mendeleev arranged the elements according towhile Moseley arranged them
according to... ..
5. The scientist..... discovered that the nucleus of the atom contains protons.
6. Moseley discovered after studying rays properties that the periodic properties of
elements are related to their and not to their.....
7. Moseley located and elements below his table.
8. The scientist..... had discovered the main energy levels of the atom .
9. In the modern periodic table, elements are arranged according to and
.....
10. The number of known elements till now is elements, where
elements are found in the nature.
11. The modern periodic table consists of horizontal periods and..... vertical
groups.
12. Elements of S-block are located on the side of the periodic table and they are
arranged in two groups which are and.....
13. Elements of p-block are located on the side of the periodic table and they are
arranged in groups.
14. The number of a period indicates.....while the number of a group
indicates.....
15. An element its atomic number is 13,so it is located in the.....group
and.....period
16. is used as a measure for atomic size of an atom and its measuring unit
is.....
17. By increasing the atomic number within a period, the atomic size because the
.....between positive nucleus and outermost electrons increases.

18. By increasing the atomic number in groups, the atomic size due to the increase of the number of.....
19. The atomic size of magnesium ($_{12}\text{Mg}$) atom is than that of beryllium ($_4\text{Be}$) atom as the of magnesium atom is greater than that of beryllium atom.
20. The outermost energy level of metals contains 4 electrons, while that of contains more than 4 electrons.
21. During the chemical reaction, metal atom tends to electrons and changes into.....
22. During the chemical reaction, magnesium ($_{12}\text{Mg}$) atom loses electrons and changes into ion .
23.have the properties of both metals and non-metals.
24. By increasing the atomic number within a period, the metallic property..... while the non-metallic property.....
25. Each period starts with strong and ends by.....
26. Magnesium reacts with oxygen giving which is called oxide.
27. Some basic oxides dissolve in water giving which turn the litmus solution into.....
28. Metals are arranged in a order according to their in chemical activity series.
29. metal reacts instantly with water and gas evolves which burns with sound.
30. metal reacts with hot water vapour, while metal doesn't react with water.
31. Metal oxides are called oxides, while non-metal oxides are called oxides.
32. Non-metals react with oxygen giving which are known as
33. Non-metal oxides dissolve in water giving which turn the litmus solution into.....
34. Burning a piece of carbon in air produces which dissolves in water giving

1-Burning a magnesium strip in oxygen.

3-Burning a piece of coal in air.

4-Carbon dioxide with water.

5-Dissolving of magnesium oxide in water.



Science Department

Revision Sheets For 2nd prep.

Unit 1 (Lesson 1 and 2)



Write the scientific term:

1. The table in which elements are arranged according to their atomic weights.
(Mendeleev periodic table)
2. The table in which elements are arranged according to their atomic numbers.
(Mosley periodic table)
3. The table in which elements are arranged according to the atomic number and the way of filling the energy sublevels with electrons.
(Modern periodic table)
4. • A group of elements found in the middle of the periodic table and includes ten vertical columns.
(Transitional elements)
5. Elements of group zero in the modern periodic table. (inert gases)
6. • Elements of "f block in the modern periodic table. (Actinides and Lanthanides)
7. • A part from a million of million part of meter. (Pico meter)
• The measuring unit of atomic radius which is used as a measure for the atomic size.
8. The ability of the atom in covalent molecule to attract the electrons of the bond towards itself.
(Electronegativity)
9. Covalent compounds in which the difference in electronegativity between their elements is relatively high.
(Polar compounds)
10. The polar compound which consists of one oxygen atom and two hydrogen atoms.
(Water)
11. • Elements which have less than four electrons in their outermost energy level.
(Metals)
12. An atom of metallic element which loses one electron or more during the chemical reaction.
(Positive ion)
13. • Elements which have more than four electrons in their outermost energy level.
(Non-metals)
14. An atom of non-metallic element which gains one electron or more during the chemical reaction.
(Negative ion)

15. The gas which is evolved on adding dilute hydrochloric acid to a piece of magnesium. **(Hydrogen gas)**
16. A solution used to differentiate between acids and bases. **(Litmus solution)**
17. Oxides which dissolve in water producing alkalis. **(Metallic oxides)**
18. • Substances which turn the litmus solution into blue. **(basic oxides)**
• Substances resulted from dissolving of metal oxides in water.
19. • A series in which metals are arranged in a descending order according to their chemical activity. **(Chemical activity series)**
20. The gas which is produced on burning a piece of coal. **(CO₂ gas)**

21. The acid which is produced on dissolving carbon dioxide in water.

(Carbonic acid)

22. • Substances resulted from dissolving of non-metal oxides in water.

(Acidic oxides)

Locate the position of the following elements in the modern periodic table:

1-($_2\text{He}$).

He)
2

Group 1A

period 1

2-(^{17}Cl).

Cl)))
2 8 7

Group 7A

period 3

3- ($_{18}\text{Ar}$).

Ar 2 8 8

Group zero

Period 3

4- ($_{20}\text{Ca}$).

Ca))))
 2 8 8 2

Group 2A

Period 4

Calculate the atomic numbers of the following elements :

1. An element is located in the 1st period and group (1 A).

Atomic number = 1

2. An element is located in the 2nd period and group zero.

Atomic number = 10

3. An element is located in the 3rd period and group (2A).

Atomic number = 12

Give reason:

1-Mendeev left gaps in his periodic table.

Because he predicted the discovery of new elements & determined the values of their atomic weights.

2-Elements of the same group have similar properties.

- Both sodium ($_{11}\text{Na}$) and potassium ($_{19}\text{K}$) are located in the same group.

Because they have the same number of electrons in outermost energy levels.

4-Both Lithium (${}^3\text{Li}$) and nitrogen (${}^7\text{N}$) are located in the same period

Because they have the same number of energy levels.

5- The atomic size increases in groups .

Due to increase number of energy levels.

6- The atomic size of ($_{11}\text{Na}$) is greater than that of ($_3\text{Li}$)

Because number of energy levels in Sodium is more than that of Lithium.

7-Water molecule is from the polar molecules.

Because the difference in electronegativity between its elements is relatively high.

8-Solution of magnesium oxide in water turns the violet litmus solution into blue.

Because MgO is basic oxide that dissolves in water forming alkaline solution that turns litmus solution into blue

9-Solution of carbon dioxide in water turns the violet litmus solution into red.

Because CO₂ is acidic oxide that dissolves in water forming acidic solution that turns litmus solution into red

Complete:

1. The most important attempts to classify elements are **Mendeleev**, **Mosley** and **modern periodic** tables.
2. Mendeleev discovered that the properties of elements were repeated **periodically** by the beginning of each **period**
3. One of the advantages of Mendeleev's table is correcting the wrongly estimated **atomic weight** of some elements.
4. Mendeleev arranged the elements according to **atomic weight** while Moseley arranged them according to **atomic number**
5. The scientist **Rutherford** discovered that the nucleus of the atom contains protons.
6. Moseley discovered after studying **X** rays properties that the periodic properties of elements are related to their **atomic number** and not to their **atomic weight**
7. Moseley located **Actinides** and **Lanthanides** elements below his table.
8. The scientist **Bohr** had discovered the main energy levels of the atom .
9. In the modern periodic table, elements are arranged according to **atomic number** and **Way of filling of energy levels**
10. The number of known elements till now is **118** elements, where **92** elements are found in the nature.
11. The modern periodic table consists of **7** horizontal periods and **18** vertical groups.
12. Elements of S-block are located on the **right** side of the periodic table and they are arranged in two groups which are **1A** and **2A**
13. Elements of p-block are located on the **right** side of the periodic table and they are arranged in **6** groups.
14. The number of a period indicates **the number of energy levels** while the number of a group indicates **number of electrons in outermost energy level**
15. An element its atomic number is 13, so it is located in the **3A** group and **3rd** period
16. **Atomic radius** is used as a measure for atomic size of an atom and its measuring unit is **picometer**.
17. By increasing the atomic number within a period, the atomic size **decreases** because the **Attraction forces** between positive nucleus and outermost electrons increases.

18. By increasing the atomic number in groups, the atomic size **increases** due to the increase of the number of **energy levels**.
19. The atomic size of magnesium ($_{12}\text{Mg}$) atom is **larger** than that of beryllium ($_{4}\text{Be}$) atom. As the **number of energy levels** of magnesium atom is greater than that of beryllium atom.
20. The outermost energy level of metals contains **less than** 4 electrons, while that of **Non-metals** contains more than 4 electrons.
21. During the chemical reaction, metal atom tends to **lose** electrons and changes into **positive ion**.
22. During the chemical reaction, magnesium ($_{12}\text{Mg}$) atom loses **two** electrons and changes into **positive ion**.
23. **Metalloids (or semi-metals)** have the properties of both metals and non-metals.
24. By increasing the atomic number within a period, the metallic property **decreases** while the non-metallic property **increases**.
25. Each period starts with strong **metal** and ends by **inert gas**.
26. Magnesium reacts with oxygen giving **magnesium oxide** which is called **basic** oxide.
27. Some basic oxides dissolve in water giving **alkalies** which turn the litmus solution into **blue**.
28. Metals are arranged in a **descending** order according to their **chemical activity** in chemical activity series.
29. **Na and K** metal reacts instantly with water and **Hydrogen** gas evolves which burns with **pop** sound.
30. **Iron and Zinc** metal reacts with hot water vapor, while **copper and silver** metal doesn't react with water.
31. Metal oxides are called **basic** oxides, while non-metal oxides are called **Acidic** oxides.
32. Non-metals react with oxygen giving **non-metal oxides** which are known as **Acidic oxides**.
33. Non-metal oxides dissolve in water giving **acidic solutions** which turn the litmus solution into **red**.
34. Burning a piece of carbon in air produces **CO₂** which dissolves in water giving **Carbonic acid**.

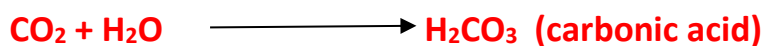
1-Burning a magnesium strip in oxygen.


$$\text{Mg} + 2\text{HCl} \xrightarrow{\text{diluted}} \text{MgCl}_2 + \text{H}_2$$

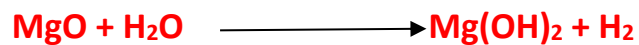
3-Burning a piece of coal in air.



4-Carbon dioxide with water.



5-Dissolving of magnesium oxide in water.



Good luck & Have fun 😊

I - Lesson One :

- 1 - Elements have been arranged (organized) (classified) in order to.....
- a. ease (facilitate) their study
 - b. find the relation between elements and their properties
 - c. (a) and (b)
 - d. no correct answer
- 2 - The most important attempts of elements classification is (are).....
- a. Mendeleev's periodic table
 - b. Mosely's periodic table
 - c. the modern periodic table
 - d. all the previous answers
- 3 - The first real periodic table is.....
- a. Mendeleev's periodic table
 - b. Mosely's periodic table
 - c. the modern periodic table
 - d. all the previous answers
- 4 - The number of elements in Mendeleev's periodic table is.....elements
- a. 92
 - b. 67
 - c. 76
 - d. 118
- 5 - Mendeleev organized the elements of similar physical and chemical properties in vertical columns known as.....
- a. periods
 - b. groups
 - c. tables
 - d. rows
- 6 - Mendeleev classified the elements of each group into.....sub-groups
- a. 7
 - b. 2
 - c. 4
 - d. 3
- 7 - The scientific idea upon which the elements are classified in Mendeleev's periodic table is.....
- a. arranging elements in an ascending order according to atomic weights
 - b. arranging elements in an ascending order according to atomic numbers
 - c. arranging elements in a descending order according to atomic weights
 - d. arranging elements in a descending order according to atomic numbers

8 – Mendeleev discovered that the atomic weight of elements.....on moving from the left side to the right side through the period

- a. increases b. decreases c. remains constant

9 – Mendeleev discovered that the properties of elements were repeated periodically by the beginning of each new.....

- a. group b. period c. cell

10 – The scientist who left vacancies in his table to be filled with suitable discovered elements in future is.....

- a. Mosely b. Rutherford c. Bohr d. Mendeleev

11 – One of the advantages of Mendeleev's table that is correcting the wrongly estimatedof some elements

- a. atomic numbers b. electron numbers c. atomic weights

12 – Mendeleev made a disturbance in the ascending order of the atomic weights of some elements to put them in.....that suit their properties

- a. periods b. groups c. tables d. places

13 – Mendeleev had to deal with the isotopes as.....elements

- a. similar b. same c. different d. identical

14 – The nucleus of the atom contains.....

- a. negative electrons b. negative protons c. positive protons

15 – The scientist who discovered that the nucleus of the atom contains positively charged protons is.....

- a. Bohr b. Mendeleev c. Rutherford d. Mosely

16 – The English scientist Mosely discovered after studying x-rays properties that the periodic properties of elements are related to their.....

- a. atomic numbers b. atomic weights c. mass numbers

17 -added zero group that includes inactive gases

- a. Mendeleev b. Mosely c. Bohr d. Rutherford

18 - The scientist.....had discovered the **main energy levels**

- a. Mosely c. Bohr
b. Hofmann d. Mendeleev

19 - The number of energy levels in the heaviest known atom is.....levels

- a. 5 b. 7 c. 9 d. 11

20 - The scientific idea upon which the elements are categorized (arranged) in the modern periodic table is arranging of elements

- a. according to their atomic numbers
b. according way of filling of energy sublevels with electrons
c. according to their atomic masses
d. (a) and (b) are correct answers

21 - The number of known elements in the modern periodic table till now is.....

- a. 18 b. 26 c. 92 d. 118

22 - The number of elements which exist in nature is.....

- a. 26 b. 95 c. 118 d. 92

23 - The number of elements which are prepared artificially is.....

- a. 92 b. 26 c. 23 d. 1

24 - The modern periodic table consists of.....horizontal periods

- a. 18 b. 118 c. 7 d. 6

25 - The modern periodic table consists of.....vertical groups

- a. 18 b. 7 c. 118 d. 92

26 - The elements of s-block are located on the.....side of the table

- a. left b. right c. middle

27 – The elements of s-block are arranged in.....groups

- a. 5 b. 3 c. 7 d. 2

28 – The block that contains groups (1A) and (2A) is called.....block

- a. s b. p c. d d. f

29 – The elements of p-block are located on the.....side of the table

- a. left b. right c. middles

30 – Groups of p-block take the letter A except group.....

- a. 1A b. 2A c. 8 d. zero

31 – The elements of p-block are arranged in.....groups

- a. 2 b. 7 c. 6 d. 5

32 – The block that contains groups (3A) and (7A) is called.....block

- a. s b. p c. d d. f

33 – Nobel gases are located in group.....

- a. 7A b. 8 c. 17 d. 18

34 – The new number of zero group is.....

- a. Zero b. 17 c. 18 d. 16

35 – Noble (inert) gases are located in.....block

- a. s b. p c. d d. f

36 – Elements of d-block are located at the.....of the modern periodic table

- a. middle c. left
b. bottom d. right

37 – Groups of d-block take the letter B except group.....

- a. 1B c. 8
b. 2B d. Zero

38 – Elements of d-block are arranged in.....groups

- a. 5 b. 10 c. 15 d. 7

39 – Elements of d-block are known as.....elements

- a. lanthanides b. actinides c. transition

40 – The transition elements **starts** to **appear** from the.....period

- a. 1st b. 2nd c. 3rd d. 4th

41 – The **number** of **elements** in **period (4)** is...the **number** of **elements** in **period (3)**

- a. more than b. less than c. equal to d. double

42 – Elements of f-block are located at the.....of the modern periodic table

- a. middle b. bottom c. left d. right

43 – Lanthanides and actinides are located in the.....block

- a. s b. p c. d d. f

44 – The number of energy levels occupied by electrons in the atom of an element indicates its.....

- a. atomic number c. group number
b. mass number d. period number

45 – The number of electrons in the outermost energy level of the atom of an element indicates its.....number

- a. atomic b. mass c. group d. period

46 – The element $_{12}\text{X}$ lies in.....in the modern periodic table

- a. period (2) and group (2A) c. period (3) and group (2A)
b. period (2) and group (3A) d. period (3) and group (4A)

47 – **Helium** lies in group.....

- a. 1A b. 2A c. 15 d. 18 (zero)

48 – The element which its atomic number (2) is.....

- a. transition element
- b. an inert gas
- c. metallic element
- d. halogen element

49 – The element which its atomic number (18) is.....

- a. transition element
- b. an inert gas
- c. metallic element
- d. halogen element

50 – The number of elements in the 3rd period of the modern periodic table is.....

- a. 2
- b. 8
- c. 18
- d. 32

51 – The number of electrons which saturate the first four energy levels can be obtained (calculated) from the relation.....

- a. $2n$
- b. $2n^3$
- c. $2n^2$

52 – The atomic number of elements equals.....

- a. the sum of the numbers of neutrons inside the nucleus
- b. the sum of the numbers of electrons rotating in its energy levels
- c. the number of protons inside the nucleus
- d. (b) and (c) are correct

53 – The number of negative electrons in the atom at its normal state equals.....

- a. number of protons
- b. number of neutron
- c. twice the number of protons
- d. half the number of neutrons

54 – The number of protons and neutrons inside the nucleus of the atom of an element is known as.....

- a. atomic number
- b. mass number
- c. period number
- d. group number

55 – The atomic number of an element is an integer and it increases from the preceding element in the same period by.....electron (s)

- a. 1
- b. 2
- c. 3
- d. 4

56 – The **atomic number** of an element which lies in **period 4** and **group 2A** is.....

- a. 4 b. 18 c. 12 d. 20

57 - The element which locates in **period (3)** and **group (3A)** is.....

- a. ${}_{13}\text{Al}$ b. ${}_5\text{B}$ c. ${}_{11}\text{Na}$ d. ${}_{15}\text{P}$

58 – The **atomic number** of an element exists in **group (7A)** and **period (2)** is.....

- a. 12 b. 7 c. 9 d. 17

~~59~~ - An element in the **third** period and group number **13**, the number of neutrons in its nucleus equals 14, so its mass number equals.....

- a. 27 b. 9 c. 15 d. 20

60 – Elements of **group (6A)** in the periodic table have the same.....

- a. number of protons
- b. number of energy levels occupied by electrons
- c. number of neutrons
- d. number of electrons in the outer levels

61 – In the periodic table, elements which are **identical in properties** lie in the same...

- a. period b. group c. nucleus d. row

62 - The chemical properties of calcium (${}_{20}\text{Ca}$) are similar to those of.....

- a. ${}_{19}\text{K}$ b. ${}_{12}\text{Mg}$ c. ${}_{25}\text{Mn}$ d. ${}_{3}\text{Li}$

63 - The element whose **atomic number** is (17) is **similar** in its **chemical construction** to the element which its **atomic number** is.....

- a. 2 b. 7 c. 9 d. 10

64 – Which of the following belongs to the **same group** in the periodic table?.....

- a. ${}_{11}\text{Na}, {}_6\text{C}$ b. ${}_{11}\text{Na}, {}_3\text{Li}$ c. ${}_{11}\text{Na}, {}_{29}\text{Cu}$ d. ${}_{11}\text{Na}, {}_{10}\text{Ne}$

65 - All the following elements are located in group (2A) **except**.....

- a. ${}_4\text{Be}$ b. ${}_{20}\text{Ca}$ c. ${}_{11}\text{Na}$ d. ${}_{12}\text{Mg}$

66 – Elements of the **same period** in the modern periodic table have the same...

- a. number of protons
- b. number of energy levels occupied by electrons
- c. number of neutron
- d. number of electrons in the outer levels

67 – In the periodic table, elements which are **different** in **properties** lie in the same...

- a. period
- b. group
- c. nucleus
- d. column

68 – Which of the following elements in the **same period** with $_{12}\text{Mg}$?.....

- a. $_7\text{N}$
- b. $_{15}\text{P}$
- c. $_3\text{Li}$
- d. $_{20}\text{Ca}$

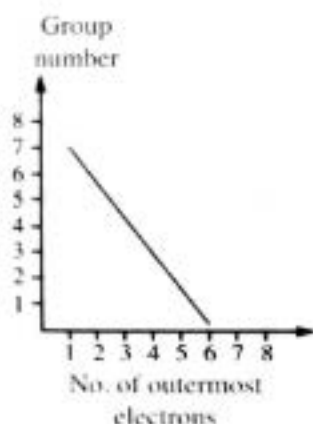
69 – Which of the following elements locates in the **third period**?.....

- a. $_7\text{N}$
- b. $_{15}\text{P}$
- c. $_3\text{Li}$
- d. $_{19}\text{K}$

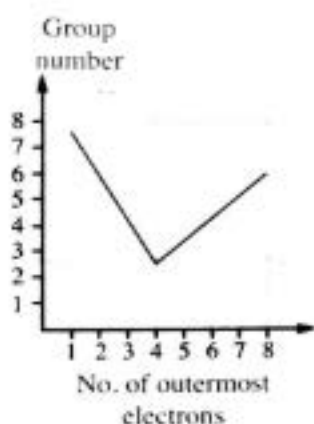
70 – Two elements $_{15}^{31}\text{P}$ and $_{16}^{32}\text{S}$ are similar in.....

- a. number of group and protons
- b. number of period and neutrons
- c. number of group and neutrons
- d. number of period and protons

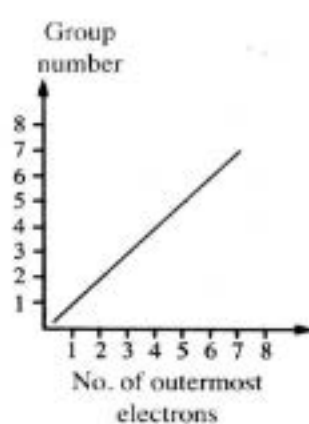
71 – Which of the following graphs represents the **relation** between the **number of electrons in the outermost energy level** and the **group number**, through the 3rd period in the modern periodic table? Why?



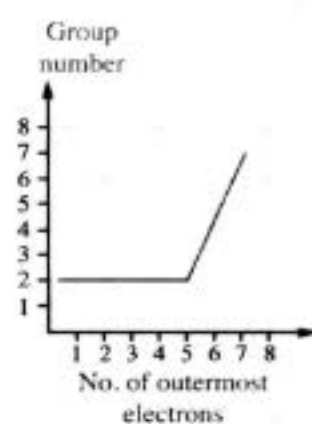
(A)



(B)



(C)



(D)

2 - Lesson Two :

1 - The atomic radius is used as a measurement of the atomic size of the atom and its measuring unit is.....

- a. metre
- b. millimeter
- c. nanometre
- d. picometre

2 - In groups, by increasing the atomic number.....

- a. atomic size decreases
- b. atomic size increases
- c. atomic radius increases
- d. no correct answer

3 - In periods, by increasing the atomic number.....

- a. atomic size decreases
- b. atomic size increases
- c. atomic radius increases
- d. no correct answer

4 -is the element that has the smallest atomic size in the periodic table

- a. F
- b. O
- c. Cs
- d. Na

5 -is the element that has the largest atomic size the periodic table

- a. F
- b. O
- c. Cs
- d. Na

- In group (1A), the atomic size of rubidium ($_{37}\text{Rb}$) is greater than that of.....

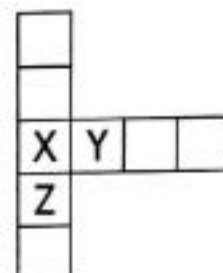
- a. $_{3}\text{Li}$
- b. $_{11}\text{Na}$
- c. $_{19}\text{K}$
- d. (a), (b) and (c)

- In period (2), the atomic size of oxygen ($_{8}\text{O}$) is greater than that of.....

- a. $_{6}\text{C}$
- b. $_{9}\text{F}$
- c. $_{3}\text{Li}$
- d. $_{5}\text{B}$

- In the opposite figure,.....represents the ascending arrangement for the element (X, Y and Z) according to the atomic size

- a. $Z > Y > X$
- b. $Y < X < Z$
- c. $Y > Z > X$
- d. $X < Y < Z$



6 – From the polar compounds is (are).....

- a. ammonia molecule
- b. water molecule
- c. methane molecule
- d. (a) and (b)

7 – Which of the following is a metallic element?.....

- a. $_{12}\text{Mg}$
- b. $_{17}\text{Cl}$
- c. $_{8}\text{O}$
- d. $_{10}\text{Ne}$

8 – During the chemical reactions, metal atoms tend to.....

- a. lose electrons and change into negative ions
- b. gain electrons and change into negative ions
- c. lose electrons and change into positive ions
- d. gain electrons and change into positive ions

9 – The electronic structure of the positive ions is similar to that of the nearest.....

- a. preceding inert gas
- b. following inert gas
- c. next inert gas
- d. similar inert gas

10 – Positive ion carries a number of positive charges equal to the number of.....

- a. gained electrons
- b. lost electrons
- c. shared electrons
- d. lost protons

11 – All the followings have the same electronic configuration of neon ($_{10}\text{Ne}$) atom except.

- a. Al^{+3}
- b. Na^{+}
- c. Li^{+}
- d. Mg^{+2}

12 – The electronic structure of sodium ion (Na^{+}) is similar to that of.....

- a. $_{7}\text{N}$
- b. $_{18}\text{Ar}$
- c. $_{10}\text{Ne}$
- d. $_{8}\text{O}$

13 – The electronic structure of magnesium ion (Mg^{+2}) is similar to all of the following except.....

- a. Na^{+}
- b. $_{10}\text{Ne}$
- c. Al^{+3}
- d. $_{18}\text{Ar}$

14 – An element (Y), its atomic number is 13, so the electronic configuration of its ion is...

- a. 2,8,3
- b. 2,8
- c. 2,8,8
- d. 2,8,8,3

15 – An element (X), its atomic number is 12, so the number of electrons in its ion equals.

- a. 10 b. 15 c. 17 d. 18

16 – The difference between sodium atom (${}_{11}\text{Na}$) and sodium ion (Na^+) is the number of...

- a. protons
b. electrons
c. energy levels
d. (b) and (c)

17 - The number of electrons located in the **ion** of trivalent metallic element whose electrons are arranged in three energy levels is.....

- a. 3 b. 8 c. 10 d. 13

18 – Which of the following is a nonmetallic element?.....

- a. ${}_{11}\text{Na}$ b. ${}_{12}\text{Mg}$ c. ${}_{13}\text{Al}$ d. ${}_{17}\text{Cl}$

19 - During the chemical reactions, nonmetal atoms tend to.....

- b. lose electrons and change into negative ions
- c. gain electrons and change into negative ions
- d. lose electrons and change into positive ions
- e. gain electrons and change into positive ions

20 - The electronic structure of the negative ions is similar to that of the nearest.....

- a. preceding inert gas
b. following inert gas
c. previous inert gas
d. similar inert gas

21 – Negative ion carries a number of negative charges equal to the number of.....

- a. gained electrons c. shared electrons
b. lost electrons d. lost protons

22 – All the followings have the same electronic configuration of neon ($_{18}\text{Ar}$) atom except

- a. P^{3-} b. S^{2-} c. Cl^- d. Na^+

23 – The electronic structure of sulphur ion (S^{2-}) is similar to that of.....

- a. ${}_7N$ b. ${}_{18}Ar$ c. ${}_{10}Ne$ d. ${}_8O$

24 – The electronic structure of phosphorus ion (P^{3-}) is similar to all of the following except.....

- a. ${}_{18}Ar$ b. Cl^- c. P^{3-} d. Na^+

25 – An element (Y), its atomic number is 17, so the electronic configuration of its ion is...

- a. 2,8,7 b. 2,8,8 c. 2,8,8,7 d. 2,8,1

26 – An element (X), its atomic number is 15, so the number of electrons in its ion equals

- a. 10 b. 17 c. 18 d. 20

27 – The difference between chlorine atom (${}_{17}Cl$) and chloride ion (Cl^-) is the number of..

- a. electrons c. energy levels
b. protons d. (a) and (c)

28 – The nucleus of X^{2-} ion is surrounded by 18 electrons revolve around it and the mass number of this ion equals 32, so the number of electrons in the X atom is.....and the number of its neutrons is.....

- a. 16, 23 b. 18, 23 c. 18, 21 d. 16, 16
-
-
-

29 – All the following from the semi-metals (metalloids) except.....

- a. tellurium b. silicon c. boron d. bromine

30 – Each period in the periodic table starts with.....

- a. metal b. nonmetal c. metalloid d. inert gas

31 – Each period in the periodic table ends with.....

- a. metal b. nonmetal c. metalloid d. inert gas

32 – By increasing the atomic number within the period, the.....

- a. atomic size decreases
- b. metallic property decreases
- c. nonmetallic property increases
- d. all the previous answers

33 – By increasing the atomic number within group (1A), the.....

- a. atomic size decreases
- b. nonmetallic property increases
- c. metallic property increases
- d. all the previous answers

34 – The strongest metallic elements lies in group.....

- a. 1A
- b. 7A
- a. 2A
- b. zero

35 – The most metallic element in group (1A) is.....

- a. Na
- b. Cs
- c. K
- d. Li

36 – The least metallic element in group (1A) is.....

- a. Na
- b. K
- c. Cs
- d. Li

37 – By increasing the atomic number within group (7A), the.....

- a. atomic size decreases
- b. metallic property increases
- c. nonmetallic property decreases
- d. all the previous answers

38 – Which of the following metals react with dilute hydrochloric acid?.....

- a. C
- b. Cu
- c. S
- d. Zn

39 – All the following elements **don't** react with dilute HCl acid **except**.....

- a. Cu
- b. Zn
- c. Mg
- d. (b) and (c)

40 – When magnesium reacts with dilute hydrochloric acid, this produces.....

- a. magnesium oxide and hydrogen gas evolves
- b. magnesium chloride and oxygen gas evolves
- c. magnesium chloride and hydrogen gas evolves
- d. no correct answer

41 – Metal oxides (as sodium oxide) are.....oxides

- a. acidic b. basic c. amphoteric d. neutral

42 – Magnesium reacts with oxygen giving.....

- a. $\text{Mg}(\text{OH})_2$ b. MgO c. MgCl_2 d. MgSO_4

43 – Magnesium oxide dissolves in water giving.....

- a. $\text{Mg}(\text{OH})_2$ b. MgO c. MgCl_2 d. MgSO_4

44 – Magnesium hydroxide turns the colour of litmus solution into.....

- a. red b. blue c. orange d. violet

45 – All the following are related to MgO except.....

- a. it is a basic oxide
b. it is a metal oxide
c. its solution turns litmus into red
d. its solution turns litmus into blue

46 – Sodium oxide (Na_2O) and calcium oxide (CaO) are from.....oxides

- a. amphoteric c. nonmetallic
b. acidic d. basic

47 – When sodium or potassium reacts with water,.....gas evolves

- a. N_2 b. O_2 c. H_2 d. CO_2

48 -react very slowly with cold water

- a. $\text{Ca} - \text{Mg}$ b. $\text{K} - \text{Na}$ c. $\text{Zn} - \text{Fe}$ d. $\text{Cu} - \text{Ag}$

49 -react with hot water vapour at high temperatures

- a. $\text{Ca} - \text{Mg}$ b. $\text{K} - \text{Na}$ c. $\text{Zn} - \text{Fe}$ d. $\text{Cu} - \text{Ag}$

50 – All the following metals react with water except.....

- a. K b. Mg c. Fe d. Ag

51 – Nonmetal oxides (as carbon dioxide) are.....oxides

- a. acidic
- b. basic
- c. amphoteric
- d. no correct answer

52 – Carbon reacts with oxygen giving.....

- a. CO
- b. CO₃
- c. CO₂
- d. Na₂O

53 – Carbon dioxide dissolves in water giving.....

- a. H₂CO₃
- b. HCO₂
- c. H₃CO₂
- d. H₂CO

54 – Carbonic acid turns the colour of litmus solution into.....

- a. red
- b. blue
- c. orange
- d. violet

55 – All the following are related to CO₂ except.....

- a. it is an acidic oxide
- b. it is a nonmetal oxide
- c. its solution turns litmus into red
- d. its solution turns litmus into blue

56 – Sulphur oxide is from.....oxides

- a. acidic
- b. basic
- c. amphoteric
- d. neutral

57 – Which of the following is a basic oxide.....

- a. CO₂
- b. Mg(OH)₂
- c. Na₂O
- d. (b) and (c)

58 – Which of the following is an acidic oxide.....

- a. CO₂
- b. SO₃
- c. Na₂O
- d. (a) and (b)

59 – The oxide which dissolves in water and produces an alkali is.....

- a. CO₂
- b. MgO
- c. CaO
- d. (b) and (c)

60 – The oxide which dissolves in water and produces an acid is.....

- a. CO₂
- b. Mg(OH)₂
- c. Na₂O
- d. (b) and (c)

61 – Al_2O_3 is known as.....oxide

- a. acidic
- b. basic
- c. amphoteric
- d. neutral

62 – The 3rd period starts with elements their oxides as the following.....

- a. acidic, amphoteric then basic
- b. acidic, basic then amphoteric
- c. basic, acidic then amphoteric
- d. basic, amphoteric then acidic

I - Write the scientific term for each of the following :

1. They are indicated by the letters s,p,d,f (.....)
2. Ascending order of the elements according to their atomic weights (.....)
3. The rays that Moseley used in his studies (.....)
4. The horizontal rows in Mendeleev's periodic table (.....)
5. The book in which Mendeleev had explained his periodic table (.....)

2 - Complete the following statements :

1. Moseley added.....group which includes.....gases
2. Mendeleev left.....in his table predicting the discovery of.....
3. The two scientists.....and.....made modifications on Mendeleev's table
4. Mendeleev had to put more than one element in one single cells as.....,.....and....

3 - Give reason for each of the following :

1. Scientists thought about classifying elements according to their properties?.....
.....

4 – To who these achievements are attributed ?

1. Discovered that the nucleus of the atom contains protons (.....)
2. Specified a place below the table for lanthanides and actinides (.....)
3. Discovered the main energy levels (.....)
4. Corrected (accurate) the atomic weights of some elements (.....)

5 – Choose the odd symbol out, then write the scientific term :

1. K – F – L – O (.....)

The scientific term :.....

2. s – b – d – f (.....)

The scientific term :.....

6 – Choose the correct answer :

- The number of energy levels in the heaviest known atom is.....levels
 - 5
 - 7
 - 9
 - 11
- Mendeleev had to deal with the isotopes as.....elements
 - similar
 - same
 - different
 - identical
- Mendeleev made a disturbance in the ascending order of the atomic weights of some elements to put them in.....that suit their properties
 - periods
 - groups
 - tables
 - places

7 – Study the opposite figure, then answer the question :

Does the opposite table is a part of Mendeleev periodic table or Moseley's periodic table? (Mention the reason)

Li	Be	B	C	N	O	F
7	9.4	11	12	14	16	19
Na	Mg	Al	Si	P	S	Cl
23	24	27.4	28	31	32	35.5

THANK YOU

I - Write the scientific term for each of the following :

1. Elements of “f” block that are located below the table (.....)
2. Elements of “d” block in the modern periodic table (.....)
3. Elements of group zero in the modern periodic table (.....)

2 - Complete the following statements :

1. Elements of groups.....are located on the **left** and **right** sides of the table, while elements of groups.....are located in the **middle** of the table
2. The **modern periodic table** consists of.....**horizontal periods**
3. The number of elements which are found in the **Earth’s crust** is....., while the rest of elements are **prepared**.....
4. The **number of elements** in the 3rd **period** of the **modern periodic table** is.....
5. **Groups of p-block** take the letter.....,except group.....that contain.....
6. **Groups of d-block** take the letter.....,except group.....that contain.....

3 - Give reason for each of the following :

1. The modern periodic table consists of 7 horizontal periods?.....
.....

4 - Put (✓) or (x) then correct the false statement :

1. The number of known elements in the modern periodic table is 181 (.....)
2. The transitional elements groups are symbolized by (d) (.....)
3. The traditional number of group 5 is 5B (.....)

5 – Complete the following table :

P.O.C	s-block elements	p-block elements	d-block elements
Location
No. of groups

6 – Choose the correct answer :

1. Noble (inert) gases are located in.....block
 - a. s
 - b. p
 - c. d
 - d. f
2. Elements of d-block are known as.....elements
 - a. lanthanides
 - b. actinides
 - c. Alkali metals
 - d. transition
3. The transition elements start to appear from the.....period
 - a. 1st
 - b. 2nd
 - c. 3rd
 - d. 4th
4. The number of elements in period (4) is... number of elements in period (3)
 - a. more than
 - b. less than
 - c. equal to
 - d. double

7 – Study the opposite figure, then answer :

From the opposite figure :

1. What are the names of the blocks X, Y and Z?

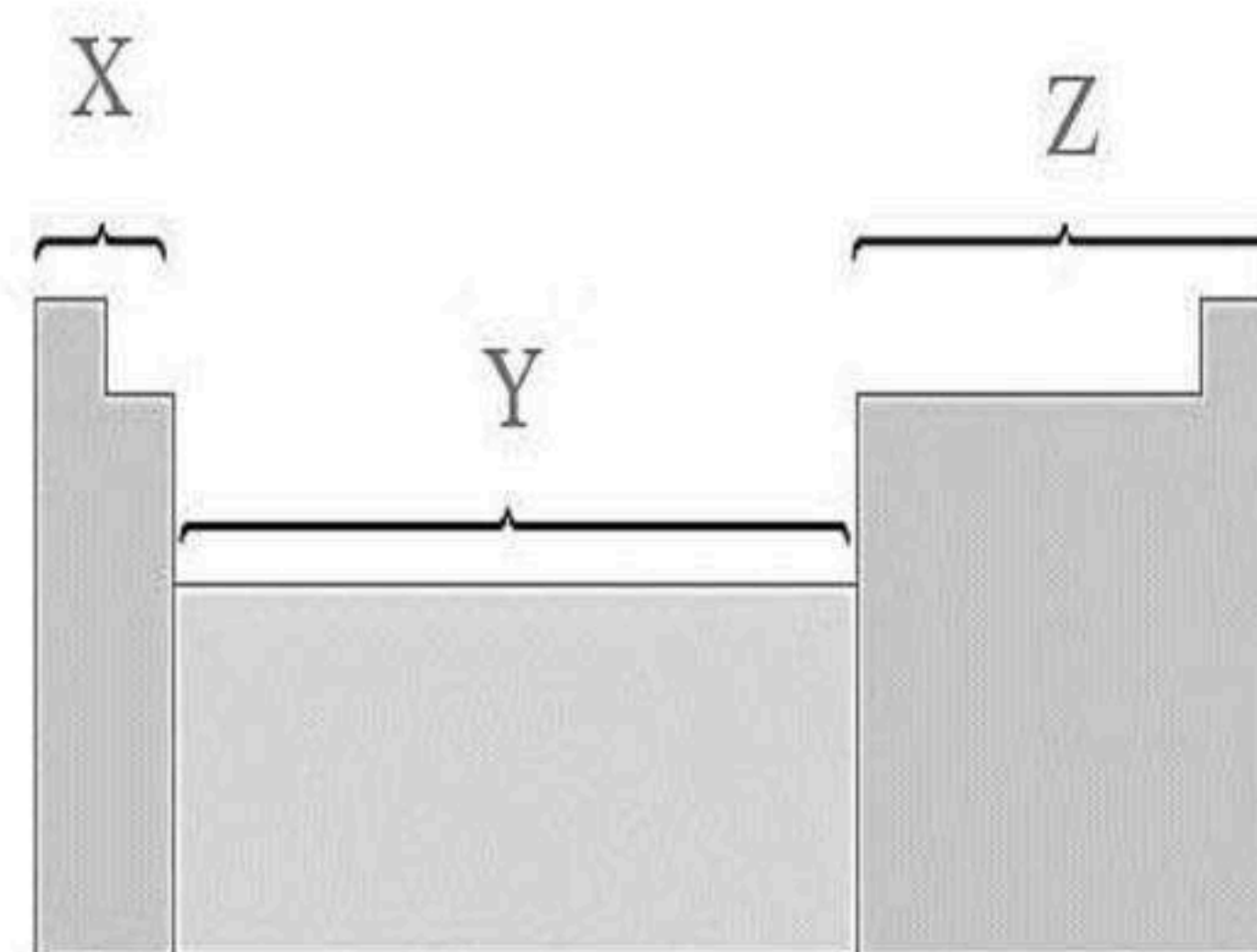
.....
.....

2. What is number of groups in each block?.....

.....

3. What is the new (modern) number of 7A and zero groups?.....

.....



THANK YOU

I - Write the scientific term for each of the following :

1. It indicates the number of energy levels occupied by electrons (.....)
2. The number of electrons rotating around the nucleus of the atom (.....)

2 - Complete the following statements :

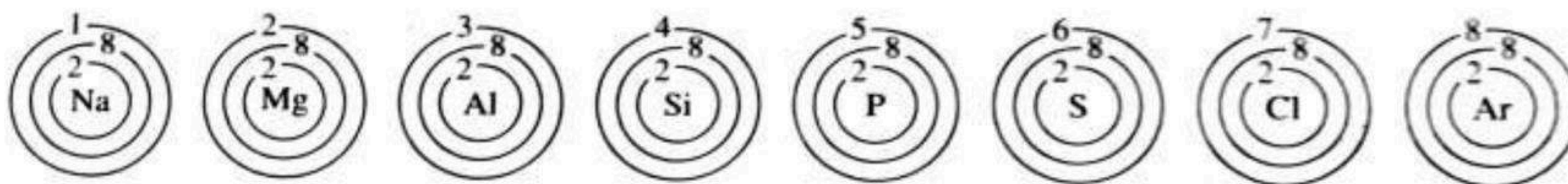
1. An element ${}_{13}\text{X}$ lies in period.....and group.....in the modern periodic table
2. An element whose 2nd energy level contains one electron, so it lies in the..... period and group.....in the modern periodic table
3. The elements $({}_3\text{X})$, $({}_{11}\text{Y})$ and $({}_{19}\text{Z})$ are similar in the.....number, while the elements $({}_3\text{X})$, $({}_4\text{W})$ and $({}_5\text{D})$ are similar in the.....number
4. An element exists in the 3rd period and group (2A), so its atomic number is.....
5. An inert gas lies in the 2nd period, so its atomic number is.....

3 - Give reason for each of the following :

1. Helium (${}_2\text{He}$) is located in group zero, but it doesn't locate in group (2A)?.....
2. Scientists can't discover a new element between sulphur (${}_{16}\text{S}$) and chlorine (${}_{17}\text{Cl}$)?...

4 – Study the opposite figure, then answer :

From the following figure :



1. What is the number of this period? Give reason
2. Does the period contain an element from d-block? Give reason
3. From the period, Determine :
 - a. Elements of s-block
 - b. Elements of p-block

.....

5 – Answer the following questions :

1. You have 3 elements, X, Y and Z of atomic numbers 12, 13, 14 respectively.

Answer the following questions :

- Explain their electronic distribution
- Determine their positions in the modern periodic table.
- In which block does each of them lie (exist)?
- The element Y lies at.....the modern periodic table (choose)

1. right side of

2. left side of

3. below

.....

.....

.....

.....

2. A trivalent nonmetallic element lies in 3rd period in the periodic table, its nucleus contains 15 neutrons .Calculate its atomic number, mass number and its block name

.....

.....

.....

.....

6 – Choose the correct answer :

1. The element which its atomic number (2) is.....

- transition element
- an inert gas

- metallic element
- halogen element

2. The element which its atomic number (18) is.....

- transition element
- an inert gas

- metallic element
- halogen element

THANK YOU

I – Compare between the following items :

1. The group and the period

P.O.C	The group	The period
Number of energy levels
Number of electrons in the outermost energy level
Chemical properties

2 - Complete the following statements :

- The element which has the atomic number (3) has.....properties to the element which has the atomic number (12) as they locate in different.....
- X and Y are two adjacent elements located in one period, if the atomic number of Y is 15, so the atomic number of (X) may be.....Or.....
- A and B are two successive elements in one group, if the atomic number of A = 3, so the atomic number of (B) may be.....Or.....

3 - Give reason for each of the following :

- Elements of the same group have similar properties?.....
.....

4 – Choose the odd symbol out, then write the scientific term :

- ${}^2\text{He} - {}^{10}\text{Ne} - {}^{18}\text{Ar} - {}^{12}\text{Mg}$ (.....)
The scientific term :.....
- ${}^3\text{Li} - {}^6\text{C} - {}^4\text{Be} - {}^{13}\text{Al}$ (.....)
The scientific term :.....

5 – Choose the correct answer :

- The **element** whose **atomic number** is (17) is **similar** in its **chemical properties (construction)** to the **element** which its **atomic number** is.....
 a. 2 b. 7 c. 9
- Which of the following elements in the **same period** with $_{12}\text{Mg}$?.....
 a. $_{7}\text{N}$ b. $_{15}\text{P}$ c. $_{20}\text{Ca}$
- Two elements $_{15}^{31}\text{P}$ and $_{16}^{32}\text{S}$ are similar in.....
 a. number of group and protons c. number of group and neutrons
 b. number of period and neutrons d. number of period and protons

6 – Study the following figure, then answer the questions :

Using the following diagram of the periodic table, answer the following questions :

$_{1}\text{H}$																			$_{2}\text{He}$
3	X																		
11	12																		
19	M					N													

- Write the letter(s) of the element(s) which :
 a. among transition elements (.....)
 b. in period (3) and group (6A) (.....)
 c. among nobel gases (.....)
- Choose :
 a. The **letter** (M) represents.....**element**
 a. $_{12}\text{Mg}$ b. $_{16}\text{S}$ c. $_{20}\text{Ca}$ d. $_{18}\text{Ar}$
 b. The **element** (N) lies in.....**block**
 a. s b. p c. d d. f
- What is the **atomic number** of the elements N and Z?

THANK YOU

I - Write the definition of each of the following :

1. Picometre (Pm) :.....
.....

2 - Write the scientific term for each of the following :

1. The **smallest** atomic size element in the periodic table (.....)
2. The **largest** atomic size element in the periodic table (.....)

3 - Complete the following statements :

1.is used as a measure for atomic size of an atom and its measuring unit is.....
2. In **periods**, the **atomic size** is.....proportional to the **atomic number**
3. Elements of **group**.....have the **largest** atomic sizes in the modern periodic table, while elements of **group**.....have the **smallest** atomic sizes
4. The **atomic size** of **lithium** ($_3\text{Li}$) **atom** is.....than that of **nitrogen** ($_7\text{N}$) **atom** and.....than that of **sodium** ($_{11}\text{Na}$) **atom**

4 - Give reason for each of the following :

1. In groups, by increasing the atomic number, the atomic size increases?.....
.....
2. In periods, by increasing the atomic number, the atomic size decreases?.....
.....

5 - Put (✓) or (x) then correct the false statement :

1. In **groups**, the atomic size increases as we go from top to bottom (.....)
2. The atomic size of ($_{11}\text{Na}$) atom is more than that of ($_{19}\text{K}$) (.....)
3. In **periods**, the atomic size increases as we go from left to right (.....)
4. The **element** ($_8\text{X}$) has smaller **atomic size** than **element** ($_6\text{Y}$) (.....)

6 – Choose the correct answer :

1. In group (1A), the atomic size of rubidium ($_{37}\text{Rb}$) is greater than that of.....
 - a. $_{3}\text{Li}$
 - b. $_{11}\text{Na}$
 - c. $_{19}\text{K}$
 - d. (a), (b) and (c)

2. In period (2), the atomic size of oxygen ($_{8}\text{O}$) is greater than that of.....
 - a. $_{6}\text{C}$
 - b. $_{9}\text{F}$
 - c. $_{3}\text{Li}$
 - d. $_{5}\text{B}$

Amo Madian

THANK YOU

1 - Write the definition of each of the following :

1. Electronegativity :.....
.....

2 - Write the scientific term for each of the following :

1. A kind of elements that doesn't have electronegativity (.....)

3 - Complete the following statements :

1.and.....are examples of polar compounds
2. In water molecule,.....atom attracts the electrons of the bond more thanatom as it has higher.....

4 - Give reason for each of the following :

1. Ammonia molecule (NH_3) is from the polar covalent compounds?.....
.....
2. Water is more polar than ammonia?.....
.....

5 – What happens when :

1. The electronegativity difference between the hydrogen atom and oxygen atom in water molecule is vanished?.....

6 - Put (✓) or (x) then correct the false statement :

1. The covalent bond becomes a polar bond when the difference in electronegativity between the bonded atoms = zero (.....)
2. Methane is from polar compounds (.....)
3. The bond between atoms in water molecule is a covalent bond (.....)

THANK YOU

I - Write the definition of each of the following :

1. Metalloids (semi-metals) :.....
.....

2 - Write the scientific term for each of the following :

1. An atom **lost** or **gained** one electron or more during chemical reactions (.....)
2. The **inert** gas which has the same electronic structure of (P⁻³) (.....)

3 - Complete the following statements :

1. The **last level** of **metallic** elements contains.....than **four electrons**, while that of **nonmetallic elements** contain.....than **four electrons**
2. During the chemical reaction, **magnesium** (₁₂Mg) atom loses.....electrons and changes into a.....ion, which carries.....positive charges
3. A **negative ion** carries a number of.....charges equals number of the.....electrons
4. **Silicon** (₁₄S) is a.....element which has the properties of.....and.....

4 - Give reason for each of the following :

1. **Sodium** (₁₁Na) atom tends to form a **positive ion**,?.....
.....

5 – What happens when :

1. A metallic atom **loses** one electron or more during the chemical reaction?.....
.....
2. A nonmetallic atom **gains** one electron or more during the chemical reactions?.....
.....

6 - Put (✓) or (x) then correct the false statement :

1. The number of **electrons** in the **negative ion** is less than that of **its atom** (....)
2. The number of **energy levels** in the **negative ion** is less than that of **its atom** (....)
3. **Bromine** is from metalloid elements (....)

7 – Choose the correct answer :

1. The **difference** between sodium **atom** (${}_{11}\text{Na}$) and sodium **ion** (Na^+) is number of..
 - a. protons
 - b. electrons
 - c. energy levels
 - d. (b) and (c)
2. An **element** (Y), its **atomic number** is 17, so electronic configuration of its **ion** is..
 - a. 2,8,7
 - b. 2,8,8
 - c. 2,8,8,7
 - d. 2,8,1
3. The **nucleus** of X^{-2} ion is **surrounded by 10 electrons** revolve around it and the **mass number** of this **ion** equals 16, so the **number of electrons** in the X atom is.....and the **number** of its **neutrons** is.....
 - a. 8, 8
 - b. 8, 16
 - c. 18, 21
 - d. 16, 16

8 – Answer the following questions :

1. Which of the following figures represents :

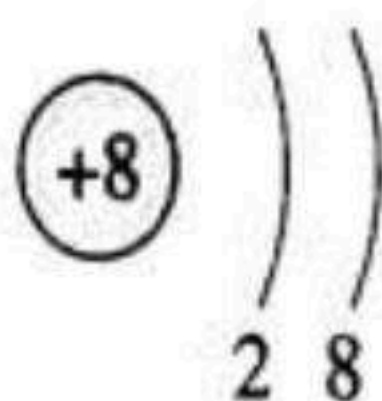


Fig. (A)

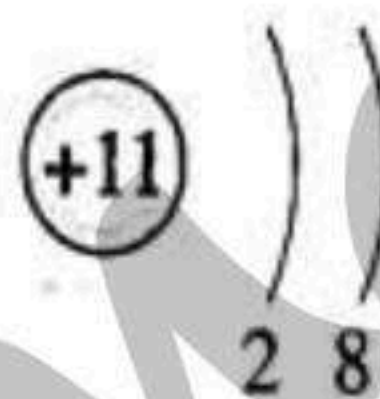


Fig. (B)

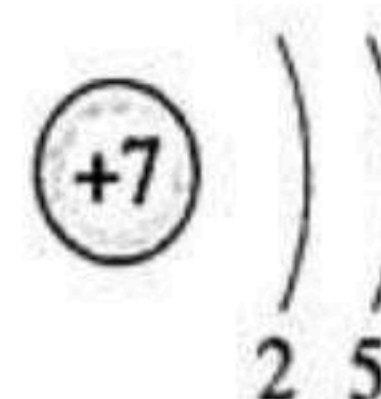


Fig. (C)

- [illegible]

[illegible]

THANK YOU

I - Write the definition of each of the following :

1. Metalloids (semi-metals) :.....
.....

2 - Write the scientific term for each of the following :

1. A group which contains the strongest metals (.....)
2. A group which contains the strongest non-metals (.....)
3. The strongest (most) metallic element in group (1A) (.....)
4. The least metallic element in group (1A) (.....)

3 - Complete the following statements :

1. Each period in the modern periodic table starts with.....and ends with.....
2. By increasing the atomic number within a period, the metallic property....., while the nonmetallic property.....
3. The most metallic element in group (1A) lies at the....., while the least metallic element lies at the.....of the group
4. By increasing the atomic number in group (1A), the metallic property.....
5. By increasing the atomic number in group (7A), the nonmetallic property.....

4 - Give reason for each of the following :

1. Nonmetallic property of oxygen (${}_8\text{O}$) is more than that of nitrogen (${}_7\text{N}$)?.....
.....
2. Metallic property of potassium (${}_{19}\text{K}$) is more than that of sodium (${}_{11}\text{Na}$)?.....
.....
3. The nonmetallic property decreases from top to bottom as in group (7A)?.....
.....

5 – What happens when :

1. We go from up to down inside the group (1A)?.....
.....

2. We go from **up** to **down** inside the group (7A)?.....

.....

6 - Put (✓) or (x) then correct the false statement :

1. **Cesium** is the strongest metal in the modern periodic table (.....)

2. **Fluorine** is the strongest nonmetal in the modern periodic table (.....)

7 – Choose the correct answer :

1. By **increasing** the **atomic number** within **group** (1A), the.....

a. atomic size decreases

c. nonmetallic property increases

b. metallic property increases

d. all the previous answers

8 – Answer the following questions :

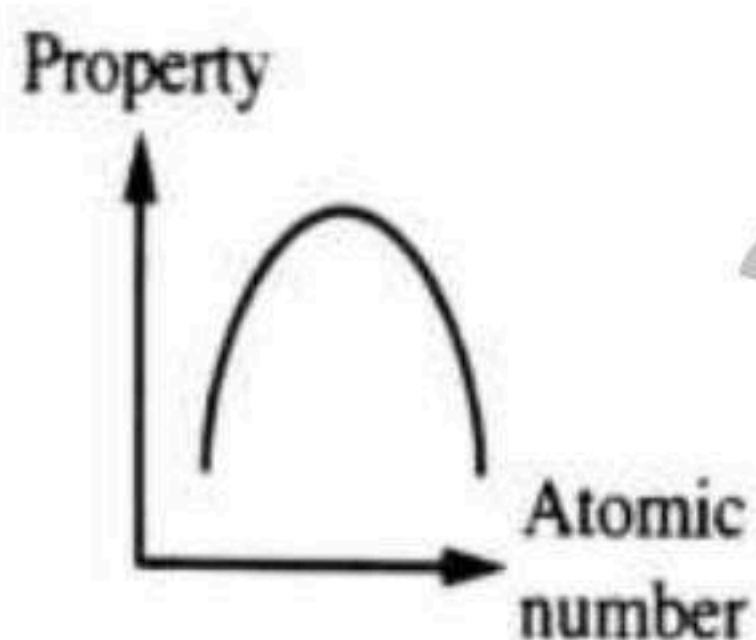
1. Three elements ${}_3\text{X}$, ${}_9\text{Y}$ and ${}_{11}\text{Z}$. Which of these elements has

The **smallest** atomic size? (.....)

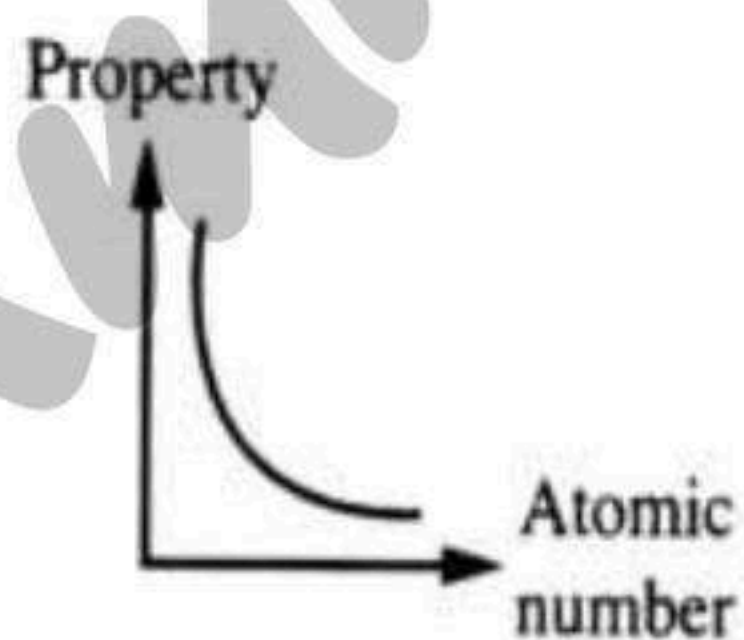
The **largest** atomic size? (.....)

c. The **largest metallic** property? (.....)

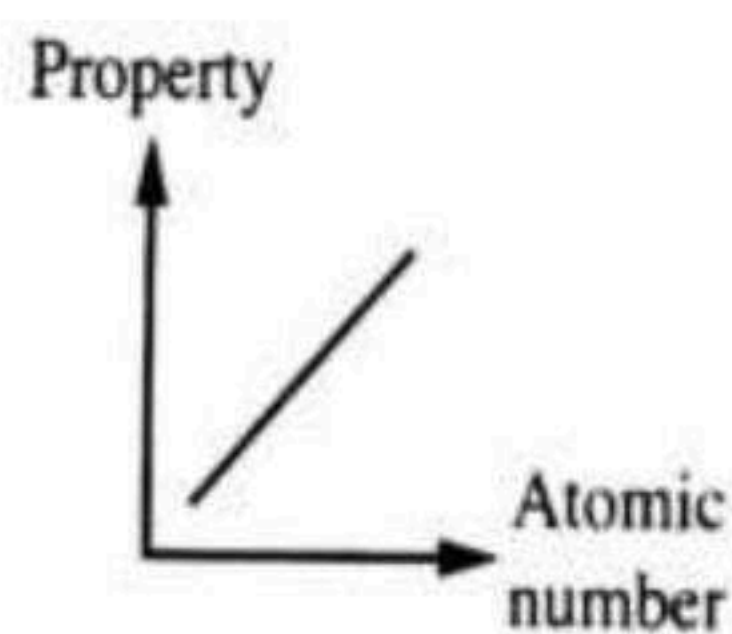
2. Which of the following figures **represents** :



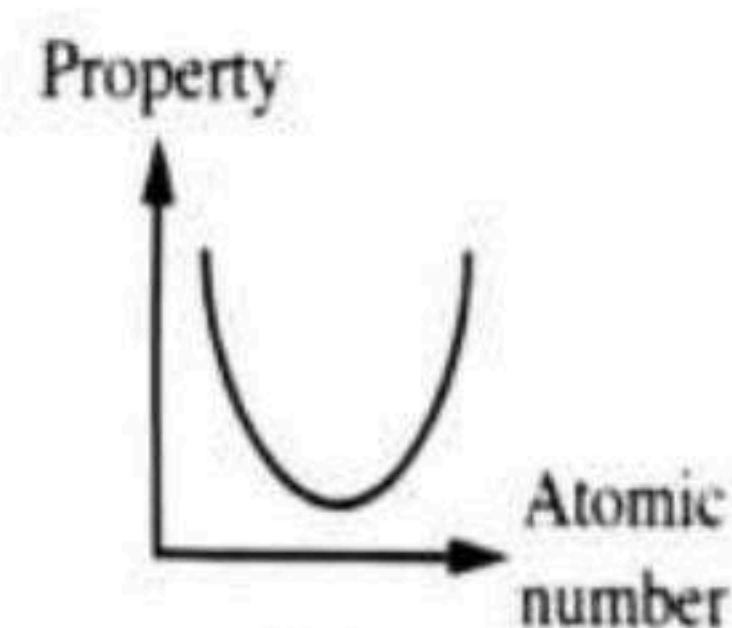
(a)



(b)



(c)



(d)

a. Graduation of **atomic size** within **group** (3)? (.....)

b. Graduation of **atomic size** within **period** (2)? (.....)

c. Graduation of **metallic property** in **group** (1A)? (.....)

d. Graduation of **nonmetallic property** in **group** (7A)? (.....)

THANK YOU

I - Write the definition of each of the following :

1. Chemical activity series :.....
.....

2 - Write the scientific term for each of the following :

1. Substance results from dissolving of metal oxides in water (.....)
2. Substances resulted from dissolving nonmetal oxides in water (.....)

3 - Complete the following statements :

1. When magnesium reacts with dilute hydrochloric acid,.....salt is formed and.....gas evolves which burns with.....sound
2. When a magnesium strip is burned in the presence of oxygen,.....powder is formed which is.....oxide
3.and.....are metals that react very slowly with cold water, while..... and.....metals react with hot water vapour at high temperatures only
4. When a piece of coal (carbon) is burned in the presence of oxygen,..... is formed which is.....oxide
5. Some metal oxides as.....are known as amphoteric oxides, as they react with acids as a base and also reacts with a base as an acid givingand.....

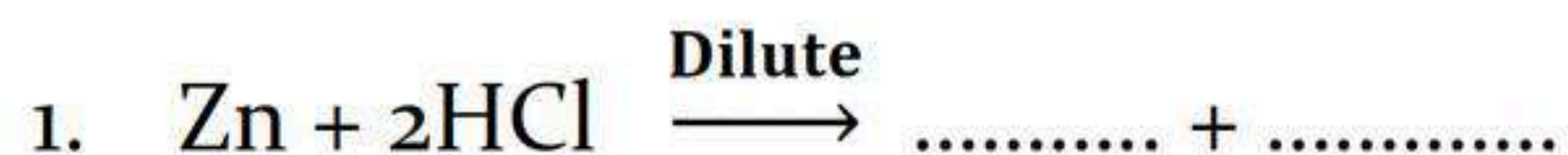
4 - Give reason for each of the following :

1. We can use water to differentiate between calcium and zinc?.....
.....
2. We can use dilute HCl to differentiate between carbon and magnesium?.....
.....

5 – What happens when : - With balanced symbolic equation -

1. Dissolving magnesium oxide in water?.....
.....
2. Dissolving carbon dioxide in water?.....
.....

6 – Complete the following chemical equations :



7 - Put (✓) or (x) then correct the false statement :

1. **Sodium oxide** (Na_2O) is a **basic** oxide (.....)
2. **Sulphur trioxide** (SO_3) is an **acidic** oxide (.....)
3. Al_2O_3 is from **amphoteric** oxides (.....)


8 – Choose the correct answer :

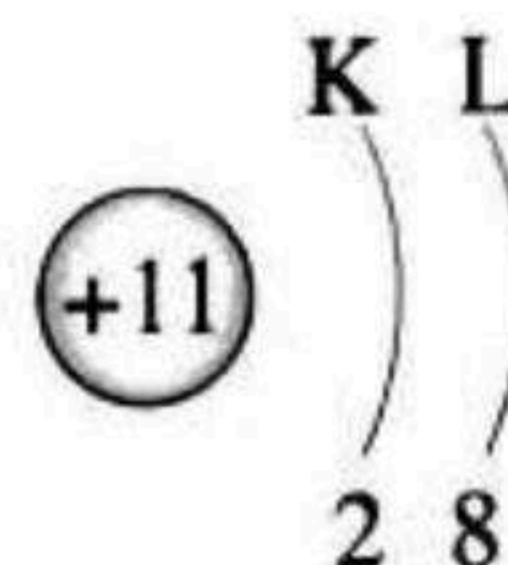
- Which of the following metals **react** with **dilute hydrochloric acid**?.....
 - Cu
 - Zn
 - C
- When **sodium** or **potassium** reacts with **water**,.....**gas** evolves
 - O₂
 - H₂
 - CO₂
- The **oxides** of the 3rd **period** elements are as the following.....
 - acidic, amphoteric then basic
 - acidic, basic then amphoteric
 - basic, amphoteric then acidic
 - basic, acidic then amphoteric

9 – Complete the following table :

1. Complete the following table :

Element	Electronic configuration	It kind	<i>Formula</i> of oxide	<i>Type</i> of oxide
$_{16}\text{S}$

2. The figure shows the **electronic distribution** of *an ion* of an element. Find
- The **atomic number** of the **atom** of this element?.....
 - Which **block** does it belong to?.....
 - The **position** of the **element** in the periodic table?.....
 - The **nearest** inert gas for this element?.....
 - The **type** of **oxide** of this element?
- 



THANK YOU

Worksheet 1 [Lesson 1]

[1] - Complete the following:

- 1 - The most important attempts to classify elements are
-----, -----and -----
-----.
- 2 - In 1913, the New Zealand scientist -----discovered
that the nucleus of the atom contains -----.
- 3 - The modern periodic table consists of -----Periods& ----- groups.
- 4 - Elements of p-block are located on the -----side of the periodic
table and they are arranged in -----groups.
- 5 - Element ${}_{13}\text{X}$ lies in period ----- and group -----.
- 6 - In the modern periodic table, f-block includes ----- and -----
-----which are located below the table.
- 7 - Elements of B are called ----- elements and they start from
period -----.
8. Mendeleev arranged the elements ascendingly according to -----
--, while Mosely arranged them ascendingly according to -----
-----.

[2] Locate the position of the following elements in the modern periodic table:

1 - ${}_{7}\text{N}$

2 - ${}_{17}\text{Cl}$

3 - ${}_6\text{C}$

4 - ${}_{10}\text{Ne}$

[3] The following figure is for one of the periods of the modern periodic table. The symbols X, Y, and Z do not represent the real symbols of these elements answer the following:

X	${}_{12}\text{Mg}$	Al	Si	P	Y	Z	${}_{18}\text{Ar}$
---	--------------------	----	----	---	---	---	--------------------

A - Locate the position of element X and Y in the periodic table.

B - Mention the kind of elements X and Z.

[4] What is the scientific principle upon which the elements are arranged in:

1 - Modern periodic table

[5] Complete the table:

Element	${}_{20}\text{Ca}$	${}_{15}\text{P}$	${}_{10}\text{Ne}$
Electron configuration			
Energy levels			
Number of period			
No. of electrons in outer energy level			
No. of group			

Worksheet 2[Lesson 1]

Question (1):

A)-Complete the following statements:

- 1)-One of the advantages of Mendeleev's table is correcting the wrongly estimated ----- of some elements.
- 2)-Mendeleev arranged the elements ascending according to -----, while Moseley arranged them ascending according to -----.
- 3)-Moseley located ----- and ----- elements below its table.
- 4)-Mendeleev discovered that the mass number (weight) of elements increase on moving from ----- side of the table to the ----- side in horizontal rows which were known later as -----.

B)-Choose the correct answer:

- 1)-The number of elements in Mendeleev's periodic table is ----- elements. (92 - 116 - 76 - 67)
- 2)-Elements are arranged in Moseley's periodic table in ascending order according to -----.
(mass number - atomic number - valency)
- 3)-The nucleus of the atom contains -----.
(positive electrons - negative protons - positive protons)
- 4)-The periodic table consists of ----- horizontal periods.
(7 - 10 - 14 - 18)
- 5)-The periodic table consists of ----- vertical groups.
(7 - 10 - 18 - 14)

Question (2):

A)-Write the scientific term:

1)-The table in which elements are arranged according to their atomic weight (mass). (-----)

2)-Elements found below the periodic table. (-----)

3)-The table in which elements are arranged according to their atomic number. (-----)

4)-Elements of group zero (0). (-----)

B)-Variant questions:

1)-Who predicated the discovery of new elements and determined their atomic mass. -----

2)-Who added inert gases to the zero (0) group.

Worksheet 3 [Lesson 2]

[1] - Complete the following:

- 1 - The ability of an atom in the covalent compound to attract the bonded electrons to itself is called the -----.
- 2 - Water & Ammonia are from -----compound.
- 3 - The descending arrangement of elements according to their chemical activities is called -----.
- 4 - The ----- & ----- increase by increasing the atomic number in the same group, while -----decreases by increasing the atomic number.
- 5 - ----- and ----- are examples of non-polar compound.

[2] What is meant by:

- 1 - Electro negativity

- 2 - Metalloid

[3] Give reasons:

- 1 - Water molecule is from polar compounds.

- 2 - The atomic size of $_{11}\text{Na}$ is greater than that of $_3\text{Li}$.

[4] Choose the correct answer:

1. When sodium reacts with water -----gas evolves.

(O_2 - CO_2 - H_2 - N_2)

2. Each period in the modern periodic table starts with ----- element.

(metallic - semi metallic - nonmetallic - inert)

3. Inside the same period, the element which has high electronegativity lies in group -----.

(0 - 7A - 2A - 1A)

[5] Write the balanced chemical equation which expresses the reaction of:

1. Carbon dioxide with water.

2. Magnesium with dilute Hydrochloric acid.

3. Magnesium oxide with water.

4. Carbon with oxygen.

Worksheet 4 [Lesson 2]

[1] - Complete the following:

- 1 - -----have the properties of both metals and non-metals.
- 2 - By increasing the atomic number within group 1A, the metallic property -----.
- 3 - -----is the strongest nonmetal element in group 7A.
- 4 - -----is the least metallic element in group 1A.
- 5 - The nonmetallic atoms tend to -----electrons and change into -----.
- 6 - Each period starts with strong ----- and the ----- decreases by increasing the atomic number.

[2] Compare between:

- 1 - Positive ion and negative ion.
- 2 - The metallic property in the group and in the period

Worksheet 5 [Lesson 2]

Question (1):

A)-Complete the following statements:

1)-By increasing the atomic number in periods, the atomic size -----due to the ----- force between positive nucleus and the outermost electrons increases.

2)-The atomic size of lithium ($_3\text{Li}$) atom is ----- than that of nitrogen ($_7\text{N}$) atom and ----- than that of sodium ($_{11}\text{Na}$).

3)-The outermost energy level of metals contains ----- 4 electrons, while that of ----- contains more than 4 electrons.

4)-During the chemical reaction, magnesium ($_{12}\text{Mg}$) atom loses ----- electrons and changes into ----- ion which carries ----- positive charges.

5)-In water molecule, the electro negativity of oxygen is (3.5) but the electro negativity of hydrogen is (2.1) , the -----atom attracts the electrons of the bond more than ----- atom as it has higher -----.

6)- ----- element has the highest electro negativity in the periodic table which equals -----.

7)-Metal oxides are called ----- oxides, while non- metal oxides are called ----- oxides.

B)-Choose the correct answer:

1)-Which of the following elements is a metallic element?

($_{12}\text{Mg}$ - $_{17}\text{Cl}$ - $_8\text{O}$ - $_{10}\text{Ne}$)

2)-The electronic configuration of magnesium ion (Mg^{+2}) is similar to all the following except -----.

(Na^+ - $_{10}Ne$ - Al^{+3} - $_{18}Ar$)

3)----- is the least metallic element in group 1A.

(Na - Cs - K - Li)

4)-All the following metals react with water except-----.

(Na - K - Mg - Cu)

5)-Acids are formed when ----- oxides dissolve in water.

(non metal - metal - amphoteric)

6)-Magnesium reacts with oxygen giving -----.

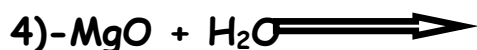
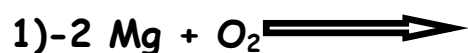
($MgCl_2$ - MgO - $MgSO_4$)

7)-All the following elements are metalloids except-----.

(thallium(Tl) - Silicon (Si) -boron (B) - bromine (Br))

Question (2):

A)-Complete the following chemical equations:



B)-Give reason for:

1)-In periods, by increasing the atomic number, the atomic size decreases.

-----.

2)-Solution of carbon dioxide in water turns the blue litmus paper into red.

-----.

3)-Water is more polar than ammonia. (Knowing that the difference of the electro negativity in water =1.2 & Ammonia = 0.9).

-----.